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ABSTRACT

The Southeastern Library Network (SOLINET) Committee on Computer Output Microfilm (COM) is drafting a plan for SOLINET's role in computer catalog production for member libraries. The primary purpose of this report is to record information on microfilm catalog production and utilization. The report presents alternative designs for SOLINET's role in microfilm catalog production. The supportive features of COM and cost justification are discussed, and descriptions are given for terminology in micrographics, library/data processing, and COM catalog production. Procedural flow charts and descriptions are provided in overviews of COM and COM catalog production processes. Additional aspects of COM catalog production considered are: (1) data base construction and maintenance; (2) local and commercial operations; and (3) microfilm systems and equipment. A description of the COM catalog at Georgia Institute of Technology, correspondence with companies, directories of COM systems service centers and vendor/service bureaus, and SOLINET retrospective conversion statistics are appended. (KP)

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Computer Output Microfilm (COM): An Alternative to Card Catalogs for SOLINET Members

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SOLINET is a regional, non-profit, membership organization which helps libraries realize their full potential in bibliographic services.

The SOLINET Committee on COM extends its deepest thanks to each vendor who contributed to this report.
While the Committee is appreciative of the efforts of these vendors, the Committee did not intend to endorse or recommend any specific vendor or product mentioned in this report.

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I. PREFACE

Charge for SOLINET's Committee on COM. The SOLINET Committee on COM has been charged with drafting a plan for SOLINET's role in COM catalog production for SOLINET member libraries. The charge has been initiated by the fact several SOLINET members have presented to the SOLINET staff strong requests for various COM products. These requests express a current need for microfilm catalogs and the need does not seem to be limited to either geographical or special interest groups. Also, in view of the announced Retrospective OCLC-MARC Distribution Service Run scheduled for spring 1977, it is anticipated that both the intensity and the number of requests will increase. Thus, a demand for microfilm catalogs is being established. To meet the demand, SOLINET must seek and determine the best alternatives for fulfilling both the short-term and long-term needs of the membership. To aid in this determination, the SOLINET Committee on COM, composed of members from SOLINET and several area libraries, was created to advise SOLINET in its search for viable alternatives.

Purpose of Report. The purpose of this report is threefold. Its primary purpose is to record information on the various aspects of microfilm catalog production and its utilization. Secondarily, it is to record alternatives that may be considered by SOLINET as it defines its role in microfilm catalog production. Finally, its purpose is to serve as an information document for the committee and those persons involved in microfilm catalog production at each library in the membership.

II. FEATURES AND COST JUSTIFICATIONS

Features. Computer output microfilm (COM) is a relatively inexpensive means for creating, maintaining, and distributing massive files of bibliographic information.[1] Many librarians now believe COM catalogs are viable and cost-effective alternatives to card catalogs, book catalogs, or on-line catalogs.[2] The major reasons for their interest in COM catalogs are:

- Ease of Maintenance. Bibliographic information on a catalog card may occasionally need to be changed. Manually altering or updating catalog cards to reflect these changes is a time-consuming process. Because of the constraints of time and personnel, these changes often cannot be incorporated. COM catalogs are produced from digital, magnetically stored files which are more easily maintained. The addition, deletion, or revision of an entry in the central data base revises the entry wherever it appears. Subsequent COM catalogs are produced with the corrected entry. Defiling and refiling catalog cards is eliminated.

- Distributed Access. COM-produced catalogs can be quickly and cheaply reproduced. It is therefore practical to have copies of the complete catalog available throughout a library as well as in multiple locations outside the library.

- Portability of the Catalog. COM catalogs and associated mechanical readers are highly portable. It is thus possible to utilize a library's COM catalog at remote locations (branch libraries, academic departments, dormatories, etc.).

- Enhanced Browsing. Multiple entries per COM catalog page or frame allow faster scanning or searching than a card catalog or computer terminal display. Further, the misfiling of entries is virtually eliminated; the entire catalog can be reviewed from one walk-up access point; patron search strategies can be refined with greater ease; and, with the proper quantity and placement of COM catalogs, heavy traffic areas and queueing problems may be minimized.

- Reduced Space Requirements. Card catalogs for fast-growing collections require frequent additions of drawers and cabinets for the cards. COM catalogs may drastically diminish this space requirement even when multiple mechanical readers are employed. Also, shifting cards from drawer to drawer is virtually eliminated.

- Security. Destruction or mutilation of one copy of the COM catalog does not endanger the integrity of the catalog. Backup copies are usually maintained, thereby allowing for speedy replacement. In addition, revised copies may be generated from the data base which is inaccessible to non-library personnel.

- Flexibility. Film images can be reproduced on a reader-printer and information for bibliographies can be accurately maintained in catalog format. Also, once a machine-readable data base has been constructed, additional products can be generated and entries can be transferred, shared, and duplicated.

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1 Rogers.
2 The Future of Card Catalogs.

- Cost Savings. Costs associated with COM catalogs may be less than the costs related to the production and maintenance of card catalogs.

- Replacement of Deteriorating Cards. By converting from a card catalog with old, heavily used, deteriorating cards, to a COM catalog, the physical form is converted to film and the problem of card deterioration is eliminated.

- Upgraded Quality of Catalog. Standardized production and maintenance procedures for the catalog can be enforced because many of these are under machine control. One addition, revision, or deletion transaction for a data base entry generates the desired action for all related catalog entries. In addition, machinable authority control may be implemented. Machinable authority control insures data consistency between related fields in multiple data base entries. The related fields most often controlled include subject, author, and series. When authority control is implemented, the number of manual revisions and corrections to data base entries can be reduced.

- Access by Mobility-Impaired Individuals. Individuals with certain types of physical handicaps are often unable to use card catalogs without assistance. COM catalogs and associated mechanical readers are readily accessible by these individuals.

Cost Justifications. Cost justification for computer-produced microfilm catalogs is a current topic in library professional literature.[3] The economics of installation and use of a COM catalog differ from library to library. These differences depend on both fixed situations, such as collection size, number of branches, and staffing patterns; and on optional choices, such as image format, entry content, conversion methodology, access to the supplier, equipment used, and so forth. An hypothetical example of one justification model is cited below.

Working assumptions:

- A central library and its 34 branches own 226,000 books and add 15,000 new ones each year.
- Annually 600,000 catalog cards are created and filed. These cards are created for an approximate cost of $.02 per card which is an average between the OCLC rate ($.039 per card) for the master set and the in-house rate for additional cards. The additional cards are produced for distribution to the branches.
- A machine-readable data base has been constructed which contains information on all books owned.
- A complete author-title-subject catalog is needed at all 35 locations. Due to several constraints, primarily cost, this need is currently not being met.
- It is desirable to meet the need as stated above without exceeding the current operating budget.
- For $.124 per cataloged book per year, a revised replacement COM catalog, with ample microfiche copies, can be published in five editions which consist of one yearly revised, reaccumulated edition and four supplemental cumulative editions. The production cost includes OCLC-MARC tape subscription expenses, data base maintenance expenses, microfilm production expenses, and mechanical-reader purchase and maintenance expenses. (See page 47 for more detail.)

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[3] See the reports by Bingham, Rogers, and Stecher (1975).

Calculations:

Card Catalogs

- Card production costs 600,000 cards x $.02	$12,000
- Branch filing (assistant librarian) 180 hours per week at $4.50 per hour	42,120
- Central filing (clerk) 70 hours per week at $2.25 per hour	8,190
- New 72-drawer catalog cabinets 4 cabinets per year at $2000 each	8,000
- Card jackets and guides	300
- Card cabinet maintenance (repairing guides and broken drawers)	500
- Total card catalog production and maintenance expenses	$71,110

Microfiche Catalogs

- A microfiche catalog is produced which includes five catalog editions within twelve months; one revised, replacement edition and four cumulative, supplement editions. The data base for the first year has an average of 233,500 recorded books.

233,500 x $.125	$29,188

According the the calculations for the model, approximately $42,000 ($71,110-$29,188) of the library's budget may be released and reallocated to other forms of productivity. The released funds, however, may not be a direct savings. All of these released funds, and more, may be expended in new forms of catalog maintenance and use instructions. Therefore, a close review of the production methods and display techniques is necessary and the production methods and display techniques must be evaluated in terms of local requirements.

Each library considering COM catalogs must realistically cost-justify them in terms of local requirements and resources. The creation and maintenance of a COM catalog using OCLC-MARC tapes is a technically complex task. This complexity must be stressed and cannot be overemphasized.

This section has presented several supportive reasons for COM catalogs and a discussion of cost justification. Beginning with a description of terms and a production overview, the balance of this report provides detailed information on data base maintenance, COM production techniques, equipment, and various guidelines that may be used when implementing COM-produced catalogs.

III. DESCRIPTION OF TERMS

Recognizing the need for the standardization of terms used in this report, three subsections of terms are presented. The first subsection includes microfilm terminology as defined by the micrographics industry. The second subsection defines several library and data processing terms as used in the context of this report. The third subsection describes several types of COM catalogs that may be produced.

Micrographics Terminology. The National Microfilm Association (NMA) has drafted and continues to maintain a widely-used glossary[4] of micrographic terms and definitions. The following terms and definitions are included in the NMA Glossary.

COM
1. Computer Output Microfilm: microfilm containing data produced by a recorder from computer generated electrical signals.
2. Computer Output Microfilmer: a recorder which converts data from a computer into human readable language and records it onto microfilm
3. Computer Output Microfilming: a method of converting data from a computer into human readable language onto microfilm.

Copy (noun)
The product obtained from reproducing an original.

Diazo film
A slow print film, sensitized by means of diazonium salts, which subsequent to exposure to light strong in the blue to ultraviolet spectrum and development forms an image. Diazo material generally produces non-reversible images. (Used in copy production.)

Film
Any sheet or strip of transparent plastic coated with light-sensitive emulsion.

Master
The original itself from which copies can be made.

Microfilm
A fine-grain, high resolution film containing an image greatly reduced in size from the original. (Two types of microfilm which fit the present needs of the SOLINET membership are as follows.)

- Microfiche: a sheet of microfilm containing multiple microimages in a grid pattern.
- Roll film: a length of microfilm on a reel, spool, or core.

Microform
A generic term for a form, either film or paper, which contains microimages.

Reduction
A measure of the number of times a given linear dimension of an object is reduced when photographed, expressed as 16X, 24X, etc.

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[4] Gildenberg, 129-196.

Silver film
A film which is coated with a silver halide emulsion. (The film often used in the production of the master film; may be positive or negative.)

Vesicular film
Film which has the light sensitive element suspended in a plastic layer and which upon exposure creates strains within the layer in the form of a latent image. (Either a reversal or a nonreversal image may be produced. Used in copy film production.)

Library/Data Processing Terminology. For the sake of clarity in this report, the following terms are defined. In defining the following library/data processing terms, Anglo-American Cataloging Rules[5] and Handbook of Data Processing for Libraries[6] were used wherever possible.

Catalog
A list of books, maps, etc., arranged according to some definite plan.

Card catalog
The familiar form of the library catalog which is updated by interfiling cards.

Catalog data base
A machine-readable catalog which contains one record for and comparable to each card maintained in the shelflist.

Collection
The total holdings of a library or group of libraries.

Data base
A file of data in machine language, available for use.

Elapsed time
The amount of time required by a computer to process a procedure or set of procedures; measurement is in terms of solar time as opposed to computer internal processing time.

Entry
A record of a bibliographical entity in a catalog or list.

Field
A set of characters treated as a whole and used to store any kind of data; a subunit in a record.

Holding
A book or work described by both bibliographic detail and copy/volume information.

Procedure
A prescribed set of steps or routines required to accomplish a task.

Publication
The production procedures required to produce a new edition or a revised, replacement edition.

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[5] Anglo-American Cataloging Rules.
[6] Hayes and Becker.

Record (noun)
A group of related fields treated as a unit; see entry.

Title
The name of a book or work preceding the statement of author, edition, and imprint statement on the title page. In this report, "title" is used interchangeably with the term "catalog data base record."

Transaction
Data representing an event which will affect records in a file by changing them, posting to them, adding them, deleting them, and the like.

Unit entry
A basic catalog entry, in the form of the main entry, which, when duplicated, may be used as a unit for all other entries for that work in the catalog by the addition of the appropriate headings.

Update
A procedure which includes the processing of transactions within a data base.

COM Catalog Products. As with the term "microfilm," the term "COM catalog" is often used generically and with a wide range of preconceptions. Before any form of microfilm catalog production can be satisfactorily implemented, the term "COM catalog" must be well-defined and understood. As used within the context of this report, the term has the following meaning.

COM catalog
A computer-formatted arrangement of bibliographic entries recorded on microfilm, wherein several entries may be displayed for each title in the data base and one or more of the entries contain(s) unit-entry information.

Several forms of COM products can be generated from a catalog data base. Some of the products are familiar catalogs; others are more appropriately termed "lists" or "registers." Seven possible catalog products are described below.

Unit-Entry COM Catalog for One Library.
Each book or work is recorded in the COM catalog by a full entry of available information wherever the entry appears at all. Thus, the entry for a given item appears the same whether it is found by the title, the author, or one of the subjects. Copy, location, and other information may be displayed with each entry of the record wherever it appears. It is usual to have one cataloged item represented by 4-6 entries in a COM-produced catalog. The cost of obtaining a COM catalog with unit-entry records from commercial sources may be estimated at $.05 to $.06 per title. (This cost does not include initial keying and conversion.) Copies of film are cheaply made: $.00016 to $.00023 per title is the commercial price range for a copy film. See page 13 for an example format for a unit-entry COM catalog.

Combination-Entry COM Catalog for One Library.

Each book or work is recorded in the COM catalog by a full entry of available information in one or more instances and is also recorded by abbreviated (truncated) entries in one or more instances. Copy, location, and other related information may be displayed with each entry of the record wherever it appears. As with the unit-entry, it is usual to count 4-6 entries per book in a COM-produced catalog. The cost of obtaining a COM catalog with combination-entry catalogs from commercial sources may be estimated to be $.023 to $.047 per title for the production of the master film. (Keying and conversion costs are not included.) Copies of the master film at commercial rates may be estimated at $.00012 to $.00020 per title. An example format for a combination-entry catalog is included on page 14.

COM Holdings List

Each book or work is recorded by an abbreviated entry which may include author, title, and subject details. Copy, location, and other information may also be included. As with the unit-entry catalog, 4-6 entries per book are generated from the data base records. The cost of obtaining a COM holdings list from commercial sources may be estimated to be $.01 to $.03 per title for the production of the master film. Copies of the master film at commercial rates may be estimated to be $.00005 to $.00010 per title. An example format for a holdings list is presented on page 15.

Unit-Entry COM Union Catalog.

The basic format for a unit-entry union catalog is similar to the format of a unit-entry catalog for one library. The number of entries is the greatest variable. Main entry may be sufficient in one instance. Author, title, and subject may be required in another. In addition, institution identifiers are appended to each entry. Costs at commercial rates are dependent upon the number of entries generated per data base record. Estimated maximum production costs at commercial rates are $.05 to $.07 per unique title in the uion data base. Copy films can be produced for the estimated commercial rates of $.00016 to $.00023 per unique title. An example format for a unit-entry catalog is included on page 16.

Combination-Entry COM Union Catalog

The union catalog format is similar to the one-library format for combination-entry catalogs. Union catalogs are produced with a variable number of entries per unique title in the union data base. As with unit-entry union catalogs, specifications are imposed by the union participants. One entry per unique title, however, contains the full bibliographic detail; related entries contain abbreviated author/title detail. All entries also include institution identifiers. Estimated production costs, at commercial rates, for the master film are $.025 to $.05 per unique data base title. Copies of the master film can be produced for the estimated commercial rates of $.00016 to $.00023 per unique data base title. An example of a combination-entry format is included on page 17.

COM Union Holdings List

Union holdings lists are produced with constraints and specifications comparable to other union products. The format of the list may be compared to both the COM holdings list and the Register of Additional Locations as produced to complement the National Union Catalog. In addition to the presence of institution identifiers, each may contain copy and location

information. Estimated master film production costs at commercial rates are $.01 to $.03 per unique title in the union data base. The production of copies of the master film at commercial rates is estimated to be $.00005 to $.00010 per unique title. An example of a holdings list format is included on page 18.

COM Union Holdings Register.

Holdings registers are normally compiled for a group of libraries, rather than for an individual library. The format of the register includes one control number for each unique title held by the union. Appended to each control number is an array of symbols noting the institutions holding the title. A holdings register requires less than 10% of the film that a holdings list requires. Thus, using a 10.1 comparative ratio and holdings list cost as a basis, holdings register production cost are estimated to be $.002 per data base title for master film production. Copies of the master film are estimated to be $.00001 per data base title. An example of a holdings register format is presented on page 19.

The total cost between each of these products can vary by several magnitudes. This variation is best seen by detailing an example. The following example details the cost variations in union products.

Working assumptions:

- 1 million unique titles are recorded in the union data base.
- 1 revised, replacement COM product is to be produced.
- Conversion expenses to a machine-readable data base are excluded.
- Mechanical-reader expenses are excluded.
- 100 copies are to be produced.
- Master film costs, as stated below, cover expenses for both computer processing and microfilm production; recovery of computer processing expenses accounts for the major portion of the master film costs.

Calculations:

- Unit entry		
Master film (1 million x .06)	$60,000	
Copy film (1 million x .0002 x 100)	20,000	$80,000
- Combination entry		
Master film (1 million x .035)	$35,000	
Copy film (1 million x .00015 x 100)	15,000	$50,000
- Holdings list		
Master film (1 million x .02)	$20,000	
Copy film (1 million x .00007 x 100)	7,000	$27,000
- Holdings Register		
Master film (1 million x .002)	$ 2,000	
Copy film (1 million x .000007 x 100)	700	$ 2,700

Cost variations in individual library products are comparable to union product variations. Thus, an individual library and a union should have a good understanding of their requirements as they make their product selection.

Formats for the seven COM products are illustrated in the following examples. The first three examples are dictionary in sequence and are detailed with the assumption that the catalog data base from which they are generated contains less than ten records. Examples 4-6 vary in sequence and are also assumed to be generated from a data base containing less than ten records. Example 7, a holdings register, assumes the production data base contains at least one hundred and twenty records. Each of the seven examples is presented only as a pictorial representation of the concepts discussed in the previous subsections. No format optimization or final product specifications have been intended.

Example 1 - Unit Entry Catalog/Dictionary Sequence

Main Entry (Book #1)

Unit Entry

copy/volume information

Main Entry (Book #2)

Unit Entry

copy/volume information

Title (Book #3)

Unit Entry

Subject (Book #2)

Unit Entry

Title (Book #2)

Unit Entry

Subject (Book #1)

Unit Entry

Main Entry (Book #3)

Unit Entry

copy/volume information

Title (Book #1)

Unit Entry

Example 2 - Combination Entry Catalog/Dictionary Sequence

Main Entry (Book #1)

Unit Entry

copy/volume information

Main Entry (Book #2)

Unit Entry

copy/volume information

Title (Book #3)

Abbreviated Entry

Subject (Book #2)

Abbreviated Entry

Title (Book #2)

Abbreviated Entry

Subject (Book #1)

Abbreviated Entry

Main Entry (Book #3)

Unit Entry

copy/volume information

Title (Book #1)

Abbreviated Entry

Subject (Book #6)

Abbreviated Entry

Main Entry (Book #4)

Unit Entry

copy/volume information

Title (Book #6)

Abbreviated Entry

Main Entry (Book #5)

Unit Entry

copy/volume information

Example 3 - Holdings List/Dictionary Sequence

Main Entry (Pook #1)
_____Abbreviated Entry_____
_____
copy/volume information

Main Entry (Book #2)
_____Abbreviated Entry_____
_____
copy/volume information

Title (Book #3)
_____Abbreviated Entry_____
_____

Subject (Book #2)
_____Abbreviated Entry_____
_____

Title (Book #2)
_____Abbreviated Entry_____
_____

Subject (Book #1)
_____Abbreviated Entry_____
_____

Main Entry (Book #3)
_____Abbreviated Entry_____
_____
copy/volume information

Title (Book #1)
_____Abbreviated Entry_____
_____

Subject (Book #6)
_____Abbreviated Entry_____
_____

Main Entry (Book #4)
_____Abbreviated Entry_____
_____
copy/volume information

Title (Book #6)
_____Abbreviated Entry_____
_____

Main Entry (Book #5)
_____Abbreviated Entry_____
_____
copy/volume information

Title (Book #4)
_____Abbreviated Entry_____
_____

Subject (Book #3)
_____Abbreviated Entry_____
_____

Subject-1 (Book #4)
_____Abbreviated Entry_____
_____

Main Entry (Book #6)
_____Abbreviated Entry_____
_____
copy/volume information

Title (Book #5)
_____Abbreviated Entry_____
_____

Subject-2 (Book #4)
_____Abbreviated Entry_____
_____

Example 4 - Unit Entry Union Catalog/Title Sequence
("xxxx" - institution symbols)

Title (Book #1)

Unit Entry

xxxx, xxxx, xxxx

Title (Book #2)

Unit Entry

xxxx

Title (Book #3)

Unit Entry

xxxx, xxxx, xxxx, xxxx, xxxx, xxxx, xxxx, xxxx, xxxx, xxxx

Title (Book #4)

Unit Entry

xxxx, xxxx

Title (Book #5)

Unit Entry

xxxx, xxxx, xxxx

Title (Book #6)

Unit Entry

xxxx, xxxx, xxxx, xxxx

Title (Book #7)

Unit Entry

xxxx

Title (Book #8)

Unit Entry

xxxx, xxxx, xxxx, xxxx

Title (Book #9)

Unit Entry

xxxx, xxxx, xxxx

Example 5 - Combination Entry Union Catalog/Author-Title Interfile
("xxxx" - institution symbols)

Author (Book #1)

Unit Entry

xxxx - copy/volume information
xxxx - copy/volume information

Author (Book #2)

Unit Entry

xxxx - copy/volume information

Title (Book #4)

Abbreviated Entry

xxxx, xxxx, xxxx, xxxx

Author (Book #3)

Unit Entry

xxxx - copy/volume information

Title (Book #2)

Abbreviated Entry

xxxx

Title (Book #3)

Abbreviated Entry

xxxx

Author (Book #4)

Unit Entry

xxxx - copy/volume information
xxxx - copy/volume information
xxxx - copy/volume information
xxxx - copy/volume information

Title (Book #1)

Abbreviated Entry

xxxx, xxxx

Author (Book #5)

Unit Entry

xxxx - copy volume information
xxxx - copy/volume information

Title (Book #5)

Abbreviated Entry

xxxx, xxxx

Example 6 - Union Holdings List/Subject Sequence
("xxxx" - institution sumbols)

Author/Title	LC Class	Pub. Date	Edition
Subject #1			
Author #1_____/Title_____	_____	_____	_____
xxxx - copy/volume information; xxxx - copy/volume information			
Author #2_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #3_____/Title_____	_____	_____	_____
xxxx - copy/volume information; xxxx - copy/volume information; xxxx - copy/volume information;			
xxxx - copy/volume information			
Subject #2			
Author #4_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #5_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #6_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #7_____/Title_____	_____	_____	_____
Subject #3			
Author #8_____/Title_____	_____	_____	_____
xxxx - copy/volume information; xxxx - copy/volume information			
Author #5_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #9_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #10_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #3_____/Title_____	_____	_____	_____
xxxx - copy/volume information; xxxx - copy/volume information; xxxx - copy/volume information;			
xxxx - copy/volume information			
Author #10_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Subject #4			
Author #11_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #6_____/Title_____	_____	_____	_____
xxxx - copy/volume information			
Author #12_____/Title_____	_____	_____	_____
xxxx - copy/volume information			

Example 7 - Holdings Register ("xxxx" represents institution symbols)

LC card no: xxxx, xxxx, xxxx
LC card no: xxxx
LC card no: xxxx, xxxx, xxxx, xxxx
LC card no: xxxx, xxxx
LC card no: xxxx
LC card no: xxxx, xxxx, xxxx, xxxx
xxxx, xxxx
LC card no: xxxx
LC card no: xxxx, xxxx
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IV. COM PRODUCTION OVERVIEW

As a direct result of participating in the Ohio College Library Center (OCLC) on-line cataloging system, all SOLINET members are creating machine-readable transaction files (OCLC-MARC tapes) that can be used to produce COM catalogs. COM catalogs, however, cannot be produced directly from OCLC-MARC tapes.

The total transformation from OCLC-MARC tapes to COM catalogs is usually achieved through the following generalized procedures. (See also Figures 1-2, pages 21-2.)

1. Record, through the OCLC 100 terminal, all catalog maintenance activity which includes additions, revisions, and deletions for new and existing titles. This activity is recorded by the OCLC on-line system onto and OCLC-MARC magnetic-tape file which is forwarded to the recording institution.

2. Format and sort the OCLC-MARC file, creating a catalog data base transaction-file. Formatting restructures all OCLC-MARC records to conform to the data base record specifications. Sorting places all formatted records in order by data base control fields such as LC call number or accession number.

3. Using the sorted transaction-file, update the catalog data base insuring that the most current information for each recorded title is incorporated. Also produce an edit list detailing the status of all transactions and produce a statistical recap summarizing the maintenance activity.

4. COM catalog entries are created from the bibliographic data base. From the data base titles, generate and format all catalog entries so they conform to both COM catalog tracing and sorting specifications.

5. Sort the catalog entries into the specified sequences (author, title, subject, shelf, and others) and write the sorted entries onto a print-image file.

6. Process the print-image file with a COM recorder, wherein the master-film catalog is produced.

7. Duplicate the master-film catalog and provide the required number of copy-film catalogs.

FIGURE 1

Data Base Maintenance

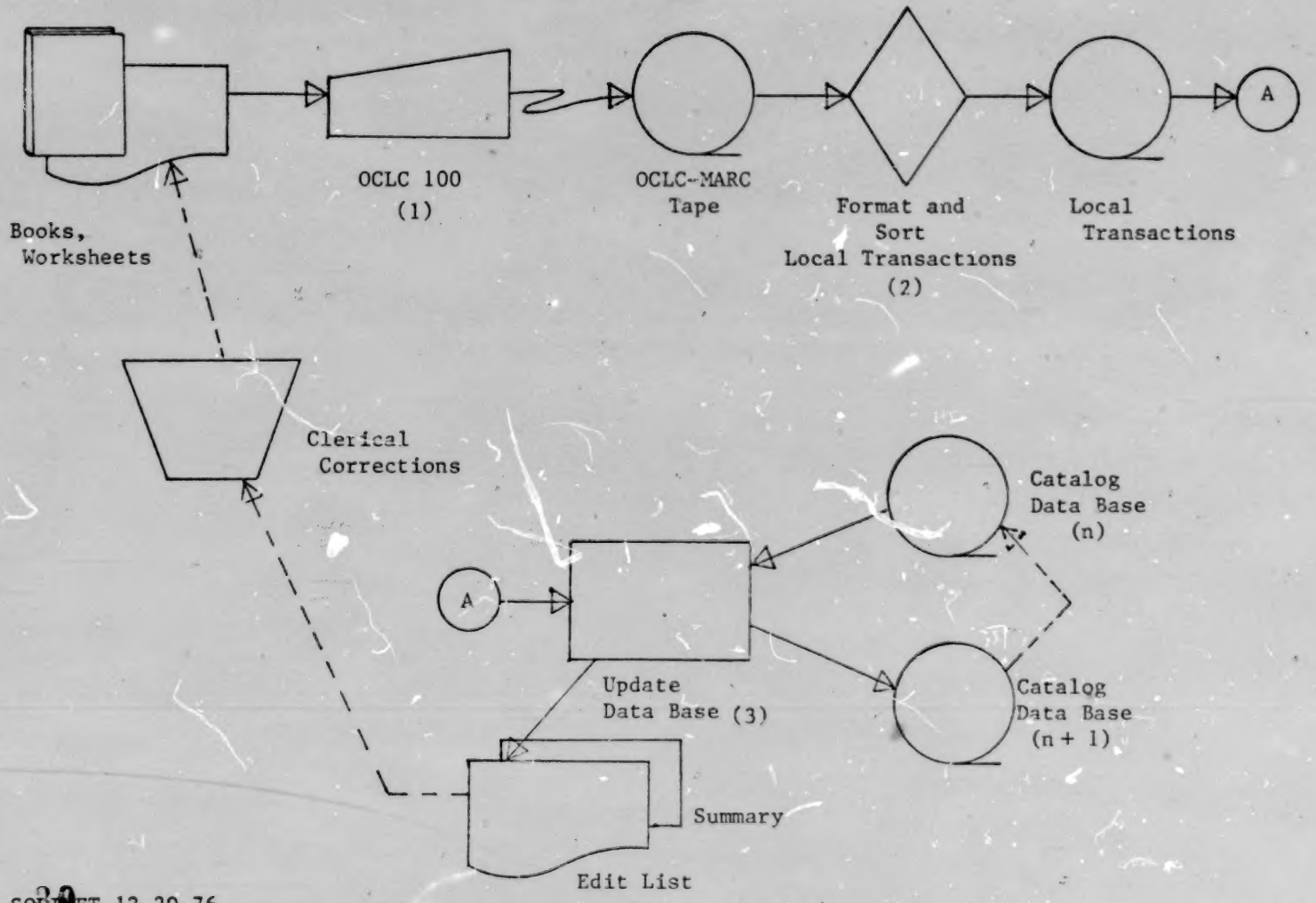
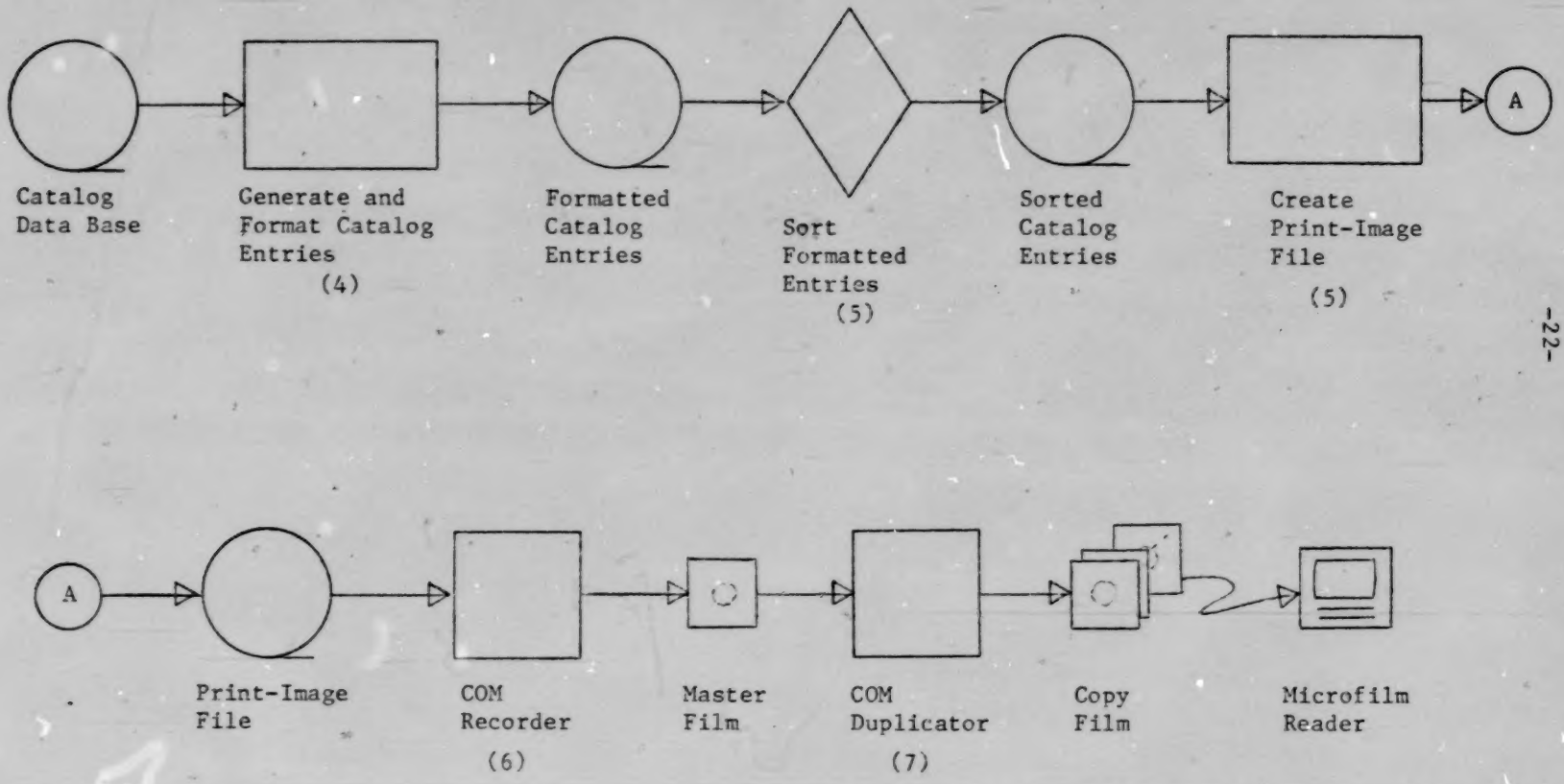


FIGURE 2

COM Catalog Production



V. DATA BASE CONSTRUCTION AND MAINTENANCE

Prior to generating effectively any computerized products other than reports on current activity, a machine-readable catalog data base must be created and maintenance procedures implemented. The purpose of this section is to discuss many of the considerations which must be reviewed prior to the establishment of data base construction and maintenance procedures. Each of the following subsections deals with a different consideration.

Local Operations Versus Commercial Operations. The construction of a data base may utilize local operations, commercial operations, or a combination of the two. Several SOLINET members have, available for their use, the services of a local data processing center. Computer services furnished by these centers are often gratis or significantly discounted from commercial rates. Services received through such data centers are, in this report, termed "local operations." Other members must depend on outside sources for data processing support. Computer services acquired by these members and paid for at commercial rates are termed "commercial operations."

Conversion To A Data Base. Creating a catalog data base is often as perplexing as it is overwhelming. For a SOLINET member beginning at time n, the member can begin building its own data base from OCLC-MARC tapes. Before data base construction can begin, the member must decide if construction will be through local operations or through commercial operations. After this has been determined and after a proven computerized data base maintenance system is operational, construction may begin. The earliest available OCLC-MARC tape should be used as the initial input for the establishment of the data base. Subsequent tapes, processed in order of creation, can then effectively be used to construct and maintain the data base. After a period has elapsed wherein the library has had the opportunity to become familiar with the data base and its maintenance procedures, a sample catalog should be displayed so it can be reviewed for integrity. Integrity may be confirmed by comparing the contents of the sample to the corresponding entries in the shelflist. After determining from a series of samples and other test procedures that the machine-readable data base is compatible with the shelflist, and that adequate maintenance procedures are employed, actions may be initiated which would lead toward the closing of the public card catalogs.

Closing the public card catalogs means no additional cards will be added to them when new titles are acquired and cataloged by the library. Before closing occurs, a second form of public display must be implemented. Once implemented, in order to determine if the library holds a particular title, a two-step look up procedure may be necessary; a search in the closed card catalog, plus a search in the new form of display. To eliminate this two-step procedure, all retrospective holdings (those holdings held by the library yet unrecorded in the catalog data base) must be recorded.

Recording retrospective holdings can be accomplished through several methods. A few possible methods are listed below.

Retrospective conversion methods:

- Use cataloging terminal on a time-available basis.
- Fund a retrospective conversion project using the OCLC system, e.g., Florida COMCAT Project.[7]

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[7] Exhibit H, Appendix, provides cursory statistics resulting from the Florida COMCAT Project.

- Create a machine-readable LC card number register for respective holdings and pass the numerical register against a MARC (Machine Readable Catalog) compatible data base; "no-hits" will have to be handled separately.
- Employ a commercial service bureau to convert retrospective holdings, e.g., Bro-dart, Science Press, etc.,

Before a retrospective conversion is achieved, microfilming the contents of a card catalog by means of a rotary camera may be desirable. This practice has several merits, including file preservation and security. As recorded in the Library Journal,[8] the University of Washington, through the aid of temporary student help, microfilmed 2.8 million cards in 20 days for a total cost of $2,930. Even with the merits of such projects, the filmed catalogs are missing the reinforcement and flexibility provided by a machine-readable data base. Because of these missing characteristics, card catalog microfilms are viewed in this report as a poor, long-term alternative to COM catalogs.

Initial and Continuing System Expenses. Catalog data base system expenses are those expenses related to the establishment and continued use of both manual and computerized procedures which deal with the construction and maintenance of the data base. For local operations these expenses are embedded and may be hard to identify. For commercial operations, these expenses are more visual. In either case, attempting to quote generalized values is speculative. Since the expenses for local operation are embedded, they receive the greatest emphasis in the following paragraphs.

Any computer system designed to support a data base has a limited life expectancy. Five years is the standard assumed within this report. This five-year standard does not mean a given system is redesigned from the beginning every five years. It does mean most systems are modified and enhanced over a five-year period to the extent that relating each portion to its initial counterpart becomes difficult. If system evolution does not occur, technological changes in the industry will force a complete redesign. Thus, initial costs for a computerized system should be effectively amortized over a five-year period. Also, continued research and development costs for successive systems can be charged as maintenance expenses rather than pooled into a five-year escrow account. Either way, these costs are real and must be borne by the library, unless these computer-related expenses are treated as gratis and are paid for by a second party. The development of a tape-oriented data base system with no authority control can be accomplished in four to five man-months. Such a system would probably be adequate for a small library with no branches or special considerations. Changing any one of these variables could substantially increase the number of man-months required.

The life expectancy of a data base system may also be dependent upon the size of the data base. With the acquisition of new titles, the data base will have a tendency to increase continously in size. When compared to data bases serving financial institutions, the growth rate for the catalog data base often seems fast and unlimited. Without the proper design, the computerized system supporting the catalog data base can quickly become outmoded. Even with a proper design, size limitations are imposed. Economies of scale work in both directions. Attempts to utilize a system designed to support 750,000 titles may prove impractical when only 30,000 titles are recorded, and vice versa.

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[8] "Apprehensive Librarians Microfilm Catalog."

Data Base Characteristics. The characteristics of a catalog data base and its records can be as diverse as the individuals responsible for its construction. No national standards exist for the construction of a machine-readable catalog data base. During the 1960's the MARC[9] communications format was adopted by the Library of Congress as a structure for transferring records between data bases. This structure was not designed to be an internal operating format. Regardless, due to the emphasis placed on resource sharing, it can be recommended that any catalog built to serve for an extended period must: 1) contain the data, tags, and subfield indicators that are convertible to or compatible with the current MARC II format, or 2) contain an index that will allow easy reference to original LC copy. The first of these two recommendations is the preferred. Without the capability to receive and transmit complete bibliographic records in the MARC II format, a library may find itself in a position where participation in cooperative ventures may be financially prohibitive, require a massive reconversion, or dictate the display of less-than-accurate information.

The architects of a library's data base must be aware of the multiple record formats that are included in the MARC design--books, serials, maps, and so forth. Even though the basic record formats are the same, special procedures are required for each format, so the variety of data field combinations can be accommodated.

A catalog data base often has excessive storage requirements when compared to data bases constructed for administrative functions. Records are usually maintained in variable-length format with each record averaging 625 characters[10] or more in length. Magnetic tape is one of the most common storage mediums. Approximately 30,000 records in MARC II format, blocked one, ASCII code, can be stored on one 24,000 feet, 1600 bpi reel of magnetic tape.

OCLC-MARC Tape Characteristics. The characteristics of the OCLC-MARC tapes are best described in the document OCLC-MARC Distribution Service.[11] Several characteristics related to the sequence of transactions on the tapes, data content in the records, and card profile specifications are not mentioned in the OCLC document. They are included in the following list.

OCLC-MARC tape considerations:

- Duplicate records, records with the same OCLC number, may appear on one tape.
- No transaction sequence number is included; records appear in order of input.
- Data bases organized and maintained by class number may experience special problems, e.g., correcting the local LC call number.
- Holdings information in the 049 field is not accumulated and carried forward by OCLC. Thus, cumulative copy/volume information must be re-input with each related transaction or accumulated during the computerized data base maintenance procedures.
- Stamp field information printed on the catalog cards is not included in the OCLC-MARC records.

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9 U.S. Library of Congress, MARC Development Office.

10 Depending upon the source, this 625 character average will vary from 450 to 750 characters. As of Georgia Tech's latest analysis, the OCLC-MARC records which include local field information, on an average exceed 700 characters.

11 Primmer.

- Series statements occasionally contain pronouns which refer back to the main entry.
- Tracing indicators should be maintained or supplied as needed.
- User option data (910 field) is not included in the OCLC-MARC records unless the field is modified by the library.
- Non-LC subject headings will not be distinguished by brackets.
- Oversize designations are not included.
- All call numbers present in the bibliographic record are included when the PRODUCE and UPDATE keys are depressed.
- All local fields must be supplied by the terminal operator for each "replace" or "update" command.
- Local field usage without constant editing contributes toward variations in format and content. Thus, OCLC-MARC records produced before maintenance procedures are stabilized may contain limited usable local information. The adoption of standards for local field input is necessary.
- Libraries anticipating the construction of a private data base should make arrangements for the acquisition of OCLC-MARC tapes before on-line participation begins. Otherwise, acquiring retrospective transactions may prove difficult.

Maintenance Standards and Procedures. The adoption of properly designed maintenance standards and procedures to be exercised by terminal operators is mandatory if the integrity of the data base is to be preserved. The standards and procedures should be recorded and appended to the current handbook for terminal operators. In turn, each terminal operator should become well-versed on both the use and meaning of each standard and procedure. Otherwise, chaos can prevail and maintenance activities can become unpredictable.

Data base maintenance procedures must allow for the addition, revision, or deletion of a new acquisition or an existing title in the data base. A terminal operator should have the capability to record and initiate any one of the three types of transactions through the on-line terminal. For local operations, an alternate set of data base maintenance procedures may be desirable and justifiable. The alternate set would provide additional flexibility by allowing for the submission of special revisions and deletions in some form other than OCLC-MARC directly to the local operations. such a submission would bypass the on-line cataloging system. To eliminate potential problems arising from the use of two sets of maintenance procedures, the alternate set should be used only as a means for resolving complex problems.

Maintenance Reports. An edit list, which details the transactions processed during the computerized maintenance procedures, should be provided. Each transaction should be listed in full bibliographic form noting any related diagnostics. The type of transaction (add, delete, revise) should also be noted. Such notations aid editorial review. Transactions can be listed in various formats ranging from the packed version as carried on the OCLC-MARC tape, to a display format similar to a card or terminal-screen image. Caution must be exercised in defining what is required. Special and elaborate formatting requires special and elaborate computer processing. Special processing in either local or commercial operations means more time, greater expense, or both.

The sequence of the entries on an edit list often conforms to the sequence of the records in the data base. Records stored in a data base that is maintained on magnetic tape are usually arranged sequentially by specified control

fields--LC call number, accession number, or a comparable field. Before transactions can be used to update the data base, they must also be arranged into the data base sequence. To achieve this sequence, the transactions are first formatted into a record structure defined by the data base maintenance procedures and the specifications usually require the generation and assignment of a transaction sequence number to each formatted transaction. This transaction number is used in conjunction with the data base control number during sort procedures. The sort procedures sequentially arrange the formatted transactions by data base control number (primary) and the transaction number (secondary). Such an arrangement insures the transactions will be processed in their proper order of occurrence. After all transactions have been sorted, the sorted transactions are used to update the catalog data base with the computerized maintenance procedures, wherein the edit list is produced. (See Figure 1, page 21.)

A summary of the update procedures is also a necessary report. The summary should tabulate file record counts, type of transactions, diagnostics, and other related information. These tabulations are necessary for file auditing and quality control. The summary, in conjunction with the edit list, is useful for identifying problem transactions and serves as means for checking the integrity of the maintenance procedures.

Manpower Requirements. Manpower needed to construct and maintain a data base must not be underestimated. Support must be provided for two areas of specialty: 1) a library data control specialist who is responsible for maintaining the integrity of the data base, and 2) a data processing specialist who is responsible for system maintenance and production. Both areas of specialty may require several individuals. Manpower requirements for these specialties are directly related to transaction volume and system complexity. Most libraries with local support find they must dedicate a minimum of one full-time position to each specialty. For the position of data control specialist, recruits are often members of the technical services staff. As with a terminal operator, recruit qualifications are argumentative. For the position of data processing specialist, a qualified individual should have proven data processing skills plus the ability to comprehend library applications. The utilization of commercial support for data base maintenance may eliminate the requirement for a data processing specialist. In such an instance, the demands and responsibilities placed on the data control specialist increase.

Security. The machine-readable files must be protected with proper security measures. Backups should be provided for two or more generations of all files used in the maintenance procedures. The design and enforcement of proper security measures cannot be overemphasized. For local operations, care must be taken to insure that unauthorized personnel do not unwittingly or maliciously gain computer access to the machine-readable files. Such access can destroy years of work in a matter of seconds. For commercial operations, care must be taken to insure that the ownership of the catalog is not in question. A contractual agreement which details the rights and interests of both parties should be completed. Included in this agreement should be a statement which requires the commercial operation to deliver periodically a current copy of the data base to a vault for safekeeping. The library should have access to this vault. Otherwise, if the commercial firm becomes financially insolvent, acquiring a current copy of the data base may be impossible or impractical. In addition, the library may elect to withdraw from the commercial operations. Withdrawing without guaranteed rights and price schedules can prove troublesome.

Data Base Integrity. The catalog data base must be maintained with the same integrity historically given the shelflist. Once the decision has been made to utilize a computerized catalog, a transition should occur wherein the computerized catalog becomes "the catalog" for all recorded titles. To accomplish this transition, a shift in attitude is often necessary. The shelflist should no longer be considered the authority for recorded titles; the shelflist should become only one means of catalog display.

The shelflist, however, must still retain a place of prominence in the library's technical and public service areas of operation. Once the catalog is computerized, the shelflist may be displayed in one of several forms: card, list, book or film. Regardless of its form of display, procedures structured around the shelflist must be established which provide catalogers the capability for noting revisions, additions, and deletions for active titles during the intervals between catalog publications.

Authority Control. Authority control with cross-references is an attractive feature of several local and commercial data base systems. This feature permits computerized authority verification during update and maintenance procedures. A number of bibliographic data fields can be verified. Author, subject, and series are the fields most commonly addressed, with subject receiving the greatest emphasis. This emphasis is accentuated by the Library of Congress publication LC Subject Headings in machine-readable form. The 8th edition, currently available in print, has not been released in machine-readable form. However, independent compilations of the 8th edition exist and provide a reasonable degree of control.

Authority files are available from sources other than the Library of Congress. One such source is an independently compiled authority file held by either a local or commercial operation. The blind acceptance and utilization of such a file is certainly open to question. A second source for an authority file is a library's own data base. From its data base a frequency-of-occurrence list can be compiled. Conflicts can be noted and corrected, permitting the compilation of a privately-owned file. And, of course, a third source is to key manually all acceptable forms of authority with corresponding cross-references. Acquiring a reasonable file from either of these three sources does require considerable planning, review, and effort.

An authority file must be viewed as an independent data base; a data base that is independent of the catalog data base. Thus, independent maintenance procedures must be provided. The complexity of these procedures depends upon the basic design of the procedures and the amount of editorial review required. The authority file should be offered the same concerns provided the catalog data base; the concerns for security, integrity, storage, maintenance, etc.

Production procedures for authority control must be supported by adequate resources and by well-defined standards and procedures. After all standards have been defined and all procedures are operational, authority integrity for the catalog data base can be imposed in one update operation. Continued authority integrity is maintained by verifying authority data in subsequent cataloging transactions before catalog update procedures are performed.

Hardware Requirements. Hardware requirements for data base maintenance often coincide with what is available. Minimum requirements are hard to define in terms of current technology. It is conceivable that a dedicated computer consisting of 32k memory, 3 magnetic tape drives, 1 card reader, and 1 printer would be adequate hardware resources for data base maintenance. The employment of such minimum hardware is rare. Most existing systems are designed to operate in multi-job environments and consume far more resources than the stated minimum. When one is considering the employment of a proposed hardware configuration, an evaluation of its performance is advisable. One set of common denominators that can be used in evaluating all data base maintenance systems, includes throughput and cost statistics. Although the continuous growth of a library's data base complicates the establishment of valid evaluation criteria, the experiences of the Georgia Institute of Technology for one month's activity, are noteworthy.

Georgia Tech's data base maintenance experience:

- CDC Cyber 70 computer and peripherals
- 125,000 titles in the data base
- 1823 transactions (authority control is not imposed)
  - 1250 additions
  - 422 data base revisions and deletions
  - 151 transaction revisions (duplicate OCLC numbers on transaction file)
- 5 hours elapsed time
- $[illegible] computer expenses at commercial rates; $9.92 actual expenses.

When reviewing Georgia Tech's experience, one must be aware of the environment in which they operate. Replicating this environment at a second institution may be impossible or impractical. Therefore, considerable caution must be exercised in using their elapsed time or actual expenses as a frame of reference. One statistic that is notable is the total number of revisions and deletions. Consistently, approximately 30-50% of Tech's transactions are revisions and deletions. Other local operations, also without any form of authority control, experience comparable percentages.

Hardware requirements for commercial operations vary extensively. Rather than review commercial operational experiences, a review of charges associated with data base maintenance is more meaningful. The following rates should be viewed only as models and should not be interpreted as absolute. All rates, unless stated otherwise, are per transaction per update.

Commercial data base maintenance rates:

Vendor	Data Base	Authority Control
Auto-graphics	10¢	5¢
Blackwell North America	$50 flat rate	26¢
Library Interface Systems	10¢ add; 4¢ revise	N/A
Science Press	Included in COM catalog production costs.	N/A

Additional Considerations. Other considerations must be identified, defined, and examined when data base construction and maintenance procedures are being reviewed. The preceding subsections note some of the primary points. For the sake of brevity, additional considerations are only listed.

Additional data base considerations:

- Support files required
- Products and services to be generated
- Location symbols
- Copy/volume information
- Special collections
- Classification and reclassification requirements
- Other

VI. COM CATALOG PRODUCTION - OVERVIEW

After a catalog data base has been constructed, many different types of library products and services can be provided. Some of these products and services include series information, management information, and records for circulation control. This section, however, deals exclusively with the production of COM catalogs. The section is divided into two parts: COM catalog production processes and COM catalog production considerations.

Production Processes. The creation of a machine-readable catalog data base does not provide products that can be directly interpreted by the human eye. Computer support, which makes the conversion from machine to eye-legible form, is required. During the conversion process, considerable machine manipulation of the records, as stored in the catalog data base, is required. This manipulation "explodes", or expands, each record into its proper entries (author, title, subject, shelf); formats, using linotype procedures, each of the entries into its print format; sorts the formatted entries into the specified catalogs (author, title, subject, shelflist, dictionary, other); and ultimately writes each entry onto a print-image file. This process of expanding, formatting, and sorting must be performed each time a COM catalog is prepared from the catalog data base.

The total process is time-consuming and can be expensive. An alternative to the expanding, formatting, and sorting process is the maintenance of a current print-image file in addition to the catalog data base. The print-image file can be updated each time the catalog data base is updated. This alternative process eliminates the need to regenerate the entire print-image file in future COM catalog productions. The main objection to this alternative is the excessive amount of file storage resources required. In either case, the balance of the conversion process consists of producing the actual microfilm. (See Figure 2, page 22, for a general description of COM procedures.)

After a print-image file has been created, it is processed by a COM recorder. A COM recorder is a mechanical device used to transcribe information from a computer tape, or directly from the computer, onto microfilm. There are three basic types of COM recorders: on-line, off-line with a minicomputer, and off-line without a minicomputer. Figures 3-5 detail these types.

1. On-line COM recorder

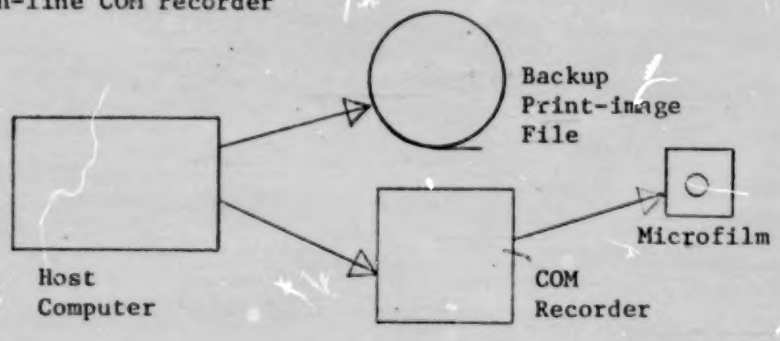

FIGURE 3: On-line COM recorder attached directly to computer and appears to be the equivalent of a high-speed printer.

2. Off-line COM recorder, with minicomputer

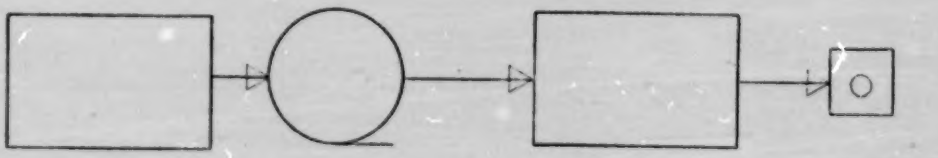

FIGURE 4: Off-line COM recorder with minicomputer; mini provides efficient format, indexes and headings.

3. Off-line COM recorder, with no minicomputer.

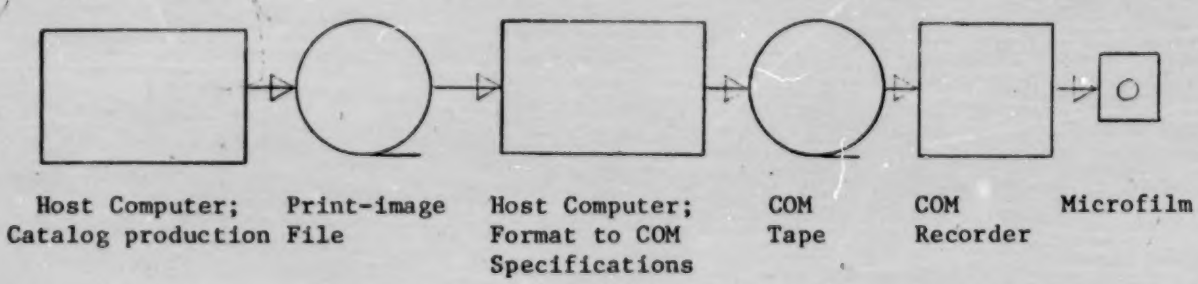

FIGURE 5: Off-line COM recorder, with no minicomputer; efficient format, code commands, indexes and headings are provided by manufacturer's software package.

Three techniques are employed in generating information on a COM recorder - cathode ray tube (CRT), electronic beam recording (EBR), and fiberoptics. Two of these techniques, CRT and EBR, generate an entire page of information onto unprocessed microfilm before the film is advanced. The third technique, fiberoptics, records only a singe line of the page onto the film before the film is advanced. The CRT technique is the oldest and most commonly used method for recording. Described simply, the CRT technique uses an electron beam to draw the desired characters for a given page on a CRT screen; the screen in turn is exposed to the film. The EBR technique, by contrast, writes the characters directly onto the unexposed film. Although CRT, EBR, and fiberoptics are the three common techniques currently used in generating characters on a COM recorder, the application of these techniques by individual COM manufacturers, utilizing various hardware configurations, can dramatically vary the quality of the final output of the COM recorder, as well as its general reliability and serviceability.

Regardless of the recording technique used, the COM recorder transcribes the formatted images onto an original silver film. The original is then developed into a positive or negative master using a wet chemical, or in some special cases a heat-sensitive development process. Once developed, the original is often saved for archival purposes. Copies of the original are produced using silver halide, diazo or vesicular copy film.

Silver film has proven to be an excellent film for storing quality images for extended periods of time. High quality, however, and high cost can be directly related. In addition to being expensive, silver film has several disadvantages. Some of the notable production disadvantages are a requirement for darkroom processing, a tendency to scratch easily, an extra processing step, and an additional time requirement. The two other types of copy film, diazo and vesicular, are more commonly used for catalog copy production.

As the catalog is produced, it may be recorded on film in either positive or negative form. For library catalog applications, negative copy appears to be superior to positive copy. On negative copy, the images are light and the background is dark. The dark background, in addition to reducing the total amoung of glare, covers most scratches, dust, and film imperfections. Background shading is available in a variety of colors, with blue being the most common. Diazo is characterized by royal blue; vesicular by light blue. Blue negatives complement mechanical readers with blue screens. COM system service centers report that the blue negative, blue screen combination is the favorite of most veteran COM users.

As with the generation of print-image files, the recording and developing procedures become complicated and require sophisticated equipment operated by skilled personnel. Most local operations do not have the equipment or personnel to perform these procedures successfully. With commercial operations, recording and developing may be performed in-house or subcontracted. Thus, the employment of a COM systems service company is often a required step in the production procedures. For a partial directory of COM systems service companies see Exhibit B, Appendix.

When entering into a contractual agreement with a COM systems service company, caution must be exercised. Several reasons support this contention. First, only a few companies support the ALA character set. Second, turnaround time may be critical for the library. Third, the quality of the film image, which

is the service company's responsibility, may vary. And fourth, prices do vary. Volume production encourages volume discounts; several libraries are eligible for volume discounts through existing state contracts.

Production Considerations. Expense and catalog content are two general production considerations that can vary considerably between subsequent microfilm catalog publications. The amount of variation is dependent upon the flexibility of the standards within the production procedures. Within a properly designed production system, requirements can be provided to meet the existing needs. Some of the considerations relevant to expense, profile, and design are listed below.

COM catalog production considerations:

- Collection size
- Entries generated per title
- Publication frequency
- Tracing indicators
- Sorting and filing rules
- Print character set to be utilized
- Bibliographic content of each entry
- Maximum characters per line per entry
- Maximum characters per line per page (page width)
- Maximum number of lines per page
- Line spacing
- Treatment of special characters
- Heading and index requirement
- Reduction ratio
- Copy/volume information
- Location information
- Relevant OCLC card profile considerations
- Underscoring and underlining requirements
- Tagged data fields in the catalog data base with indicators only
- Inserted or generated special cross-references and local cataloging comments
- Catalogs generated (main entry, title, subject, dictionary, other)
- Use of cumulative supplements
- Method of representing new titles between each COM production operation

The first three considerations in the list are worthy of additional discussion.

Collection size greatly influences total microfilm production expenses. In contrast to total expenses, unit cost (cost per title) varies little unless incremented changes of several magnitudes occur within the collection, e.g., 30,000 to 500,000 to 2,000,000. Even with these incremental changes, economies of scale may be minimal.

The number of entries generated for each title can also affect production expenses. The number of entries can vary significantly between libraries due to collection specialties, administrative decisions, and type of libraries (academic, public, and special). Most COM catalogs currently in existence contain four to six entries per title. These catalogs do not include shelf entries. Shelf entries are maintained as a separate unit which may be in card, list, book or film form.

The production frequency of COM catalogs affects yearly expenses. If each edition, within a fiscal year, costs approximately $15,000, the number of reaccumulated, revised editions will be limited to the constraints of the operating budget. For reaccumulated editions, four per year is a reasonable average. When cumulative, supplemental editions are periodically provided in place of reaccumulated, revised editions, expenses can be substantially reduced. See Section X, page 47, for a detailed example. The potential savings of $45,552 ($61,864-$16,312) as noted in the example can be attributed to the use of cumulative supplements.

The decision to produce COM catalogs through local operations or through commercial operations is not necessarily dependent upon the operation used to maintain the catalog data base. Considerations for both local and commercial operations are reviewed in the following two sections.

VII. COM CATALOG PRODUCTION - LOCAL OPERATIONS

Local operations can be a justifiable alternative for COM catalog production. This section discusses several of the considerations that must be evaluated when examining this alternative.

Before reviewing the considerations, it should be noted that institutions interested in COM catalog production through local operations should first become familiar with the concepts presented in the preceding section, COM Catalog Production - Overview. In addition, before active implementation plans are initiated, the efforts of other institutions should be reviewed. At least two SOLINET members have developed some expertise with COM products. These two are Georgia Institute of Technology, Atlanta, Georgia, and Florida Technological University, Orlando, Florida. Further, other libraires such as El Centro College, Dallas, Texas;[12] Los Angeles Public Library, Los Angeles, California;[13] University of Texas at Dallas, Dallas, Texas;[14] and University of Toronto, Toronto, Ontario,[15] have reported success with local operations. By reviewing these efforts, detailed implementation procedures which are compatible with the environment of the interested library can be compiled.

Several of the considerations as detailed in Section V may be extended to local operations production. Those considerations which are especially significant are listed below.

Local operations COM catalog production considerations:

- Importation versus development of a private system
- Implementation and continuing expenses
- Limited life expectancy of the system
- Manpower requirements
- Hardware requirements

Each of the considerations is briefly discussed in the following paragraphs.

Importation of an existing system is often impossible or impractical due to technological constraints. Systems are usually designed around specific hardware configurations and exact replications can prove unjustifiable, especially if the local operations environment is established and well-defined. On the other hand, the development of a private system can require an undesirable commitment in manpower, hardware, and other resources. The final decision on whether to import or to develop depends greatly on local conditions and the amount of funds available to support necessary expenses.

Implementation expenses can be related directly to the flexibility included in the system. Thus, estimating these expenses proves difficult. One measure

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12 "Microfilm Claimed Tops for Library Catalog."

13 Becker.

14 Bingham.

15 University of Toronto Library Automation System (UTLAS) has produced a COM catalog for the library at the University of Toronto. Unfortunately, limited recorded information regarding UTLAS's operations and experiences is available. As per a telephone conversation on November 16, 1976, between Robin Braithwaite of UTLAS and Randall Cravey of SOLINET, the catalog includes approximately 1.4 million titles and their requirements for the complete regeneration of a comparable catalog for a machine-readable data base include a dedicated Xerox Sigma 7 computer plus available peripherals and roughly 400 hours of elapsed time.

of the expense is the approximate $30,000 value a commercial operation places on its system. This value may be high or low depending upon one's point of view, but regardless, the value does point out that considerable development efforts may be required to produce a satisfactory system. Continuing maintenance expenses must also be anticipated. With a successful system, yearly maintenance expenses should be less than 25% of the total implementation expenses.

An implemented system has a limited life expectancy. Because of this limitation, implementation expenses are usually amortized over a period no greater than five years. In addition, the expenses for research and development of successive systems are an important variable. Unfortunately, quoting values for these expenses proves subjective.

For local operations production, a competent data processing specialist is required. During each production operation, numerous minor operational problems occur. Example problems are insufficent on-line work area and an unrecoverable read error. Someone must be available to solve each problem and expedite the total operation.

Hardware resources required to establish and maintain a production system may prove incidental to production resource requirements. The production requirements such as a dedicated computer, an adequate number of tape drives, extensive on-line mass storage and extended time commitments are the factors that prove most taxing on local operations. For example, the following illustration itemizes Georgia Tech's resource and time requirements for the complete generation of print-image tapes from a data base containing 125,000 titles.

Georgia Tech's COM production resource and time requirements (September 1976)

- Dedicated CDC 6400 computer and peripherals
  - 120k real memory
  - 2 tape drives
  - 122 million characters of on-line file storage
  - 75 million characters of on-line work area for sorting
- 13 print-image tapes created
  - 2400 feet, 1600 bpi tapes
  - 50,000 entries per tape
- $6700 at commercial rates ($335 actual costs)
  - $4620 central processing expense
  - $2080 peripheral expense
- 5.3¢ per data base title
- 50 hours of elapsed time
  - 24 hours formatting
  - 25 hours sorting
  - 1 hour writing print-image tapes

Due to the present production procedures utilized by Georgia Tech, elapsed time is directly proportional to the number of titles being processed. Scheduling with the computer center the necessary blocks of time for the quarterly reaccumulation of a complete catalog has become a problem. An implemented solution is the yearly production of one revised replacement catalog supported by one cumulative supplement per month for each subsequent month.

As a means of graphically displaying how various local operations are meeting COM catalog production requirements, the table, Local Operations Summary, Section IX, page 42, is presented. In this table comparative information for Georgia Tech, Florida Tech, and the study[12] from Royal Melbourne Institute of Technology (RMIT), Melbourne, Australia, is given.

16 Stecher (1975).

VIII. COM CATALOG PRODUCTION - COMMERCIAL OPERATIONS

Commercial operations can be a second justifiable alternative to COM Catalog production. This section discusses some of the considerations that should be addressed when evaluating this alternative. In addition to the considerations listed in Section VI, the following considerations should be examined.

Commercial operations considerations:

- Services offered
- Package contracts
- Data base and data base management techniques
- Software flexibility
- Accuracy of data
- Filing and sorting techniques
- Costs

Vendors and service bureaus that participate in commercial operations offer services in the following areas of COM production: (1) retrospective conversion of data; (2) update and maintenance of the data base; (3) authority control; (4) software for and production of print-image tape for production of master film; (5) production of master microfilm; and (6) lists or cards for new titles added between COM updates. Certain vendors will arrange with the mechanical-reader manufacturer for the purchase of readers and include provisions for the readers as part of a package contract.

There are a number of library-oriented vendors who will work with a library on all of the above services as a package contract. A partial list of such vendors known to SOLINET is included in Exhibit C, Appendix. As with any service over which there is no local control, and in which a supplied product is being accepted, there are many factors to consider when selecting a vendor or writing bid specifications. The following paragraphs discuss some of these factors.

Vendor data base construction, data base maintenance, and data base security procedures are worthy of extensive consideration. Authority control and its management should also be reviewed. Many of the considerations that should be noted regarding data base management and authority control are presented in Section VI, Data Base Construction and Management.

Most library vendors' software is quite flexible as to type sizes, fonts, upper-lower case, ability to represent ALA print-train characters, columns per page, reduction ratio, and fullness of entry. Most vendors can put as much or as little data in an entry as the library desires. The vendor can do this while maintaining a full entry in machine-readable form in the data base. Thus, commercial operations can furnish COM catalogs in a form designed to meet local needs. Extensive flexibility is built into the software used by most commercial systems. As with the OCLC card production system, library needs may be profiled to local specifications. Profiling, however, does have its limitations. Few, if any, commercial operations can offer the full flexibility available through local operations.

The OCLC-MARC tape considerations, as listed in Section V, page 25, must be reviewed in detail with and by the vendor. The library must be certain the vendors can interpret the use and accuracy of the holdings information. Three OCLC-MARC fields are critical - the 035, 049, and the call number fields.

Libraries utilize these fields in many variations. Some use 035 explicitly to code the type of record transaction (e.g., N-new record; R-revised record; D-delete record; E-extra cards only, etc.). Other libraries use this field for accession numbers, copy information, and so on. The library should work with the vendor possibly in restructuring these fields for future ease of interpretation and consistency of usage.

Filing and sorting procedures may vary among vendors. Those commercial operations which are able to sort all entries into ALA- or LC-prescribed filing order can provide a filing sequence similar to that normally found in a card catalog. This type of sort considers articles, abbreviations, subject heading sequences for dates and period divisions, and other filing nuances. On the other hand, those vendors that are unable to provide this service will produce film upon which entries do not appear in the conventional card catalog order. In this case, access may be impaired. Each vendor under consideration should supply a catalog (the actual product) for review of the filing and all related characteristics.

Costs are dependent upon several variables (see Production Considerations, page 33). The impact of these variables on cost is best perceived in comparative analysis. Such an analysis can be made by reviewing the examples presented in the table, Commercial Operations Summary, page 44.

Institutions interested in establishing COM support through commercial operations should become familiar with the concepts presented in this and all three preceding sections. In addition, the features of most commercial systems vary extensively. Therefore, several systems should be reviewed before a decision is made.

IX. SUMMARY OF LOCAL AND COMMERCIAL OPERATIONS

This section is a summary of local operations and commercial operations. The information provided was supplied either by published reports[17] or direct contact with the institution or organization. Information briefs and correspondence with the commercial organizations are included in Exhibits D-G, Appendix.

A comparative summary of local operations is presented in the table, Local Operations Summary, page 42. Several salient facts can be quickly identified from the information detailed in the table. First, considerable elapsed time is often required for print-tape production. This time requirement is also directly relatable to the total number of titles in the data base. However, with proper systems design and hardware support, the elapsed times given in the table could be dramatically reduced. Second, a wide range of prices is quoted for master and copy film. When one institution negotiates independently, it can usually expect to pay low-volume rates. When negotiations are made by a corporate body (a state, a consortium, etc.), high volume rates are available. And last, bibliographic content and display format greatly affect the total number of frames produced. The total number of frames dramatically affects the cost of production.

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[17] Stecher (1975).

Local Operations Summary

Comparative Descriptors	Georgia Tech	Florida Tech	RMIT
DATA BASE MAINTENANCE			
Titles in data base	125,000	125,000	125,000
Titles can be converted to MARC II format (yes,no)	yes	no	-
Annual acquisition rate	15,000	15,000	
Annual transaction rate (acquisitions x 140%)	21,000	21,000	
Monthly transaction rate (average)	1,750	1,750	
Monthly OCLC-MARC tape expense (average)	$61.25	$61.25	
Computer utilized	CDC Cyber 74 (shared)	IBM 360-65 (shared)	CDC Cyber 72 (dedicated)
Programming language	COBOL	COBOL	
Elapsed or throughput time per update (approx.)	5.5 hrs.	2 hrs.	
Computer processing charges per update (avg.)	$215.00 (commercial rate)	$150.00 (commercial rate)	
	$ 9.92 (actual rate)	$ 0.00 (actual rate)	
CATALOG PRODUCTION (one-time example or estimate)			
Number of titles	125,000	120,000	100,000
Entries generated per title (average)	4.32	5	4
Total entries	540,000	600,000	400,000
Entry bibliographic format (unit, abbreviated, combination)	unit	abbreviated	unit
Number of catalogs/lists included	3; author, title, & subject	4; author, title, subject, & shelf	-
Reduction ratio	42X	42X	48X (?)
Microfilm system (microfiche, roll film)	microfiche (neg.)	microfiche (pos.)	roll film
Frames per fiche or per foot of roll film	416 (72 char. print-line)	224 (132 char. print-line)	40
Entries per frame (average)	12	57	
Titles per frame (average)	2.78	11.4	
Computer utilized	CDC 6400 (dedicated)	IBM 360-65 (shared)	CDC Cyber 72 (dedicated)
Programming language	COBOL	COBOL	-
Elapsed or throughput time for print-tape prod.	50 hrs.	33 hrs.	150 hrs.
Computer processing charges for print-tape prod.	$6700 (commercial rate)	$3600 (commercial rate)	-
	$ 335 (actual rate)	$0.00 (actual rate)	
Print-tape processed by	COM service company	state agency	COM service company
Master-film cost	$7.00/1000 frames	$15.00/1000 frames	$27.00/1000 frames
Copy-film cost	$.06/copy fiche	$.125/copy fiche	$.0451 per foot
Frames produced	44,928	11,200	
Microfiche/roll-film-feet produced per catalog	108	50	
Master-film cost per title	$.056 (commercial rate)	$.031 (commercial rate)	
	$.005 (actual rate)	$.001 (actual rate)	

A comparative summary of commercial operations is presented in the table, Commercial Operations Summary, page 44. When reviewing the entries in the table, several points must be considered. First, the vendors were requested to supply model values based on the following assumptions: (1) they were to begin working with a data base that contained 125,000 titles; (2) the data base was to be updated with 15,000 accessions per year; (3) four revised, replacement catalogs were to be produced each year; and (4) they were to estimate the average number of catalog entries that would be generated from each data base title when using their recommended profile. Second, all of the features of each system have not been addressed. Assuming anything more than a cursory look is provided would be incorrect. The cursory look is intended to provide insight into the total number of existing variables related to the production of COM catalogs. Third, estimates for both microfiche and roll film production costs were requested for comparative analysis. No allowance has been made for equipment, cumulative supplements, or other factors that may be considered when debating the merits of microfiche or roll film. And fourth, the recorded estimates reflect direct data processing and microfilm production costs only. Expenses related to editorial reviews and other forms of overhead that must be borne by the library have not been included.

Commercial Operations Summary (model estimates)

Comparative Descriptors	Auto-graphics		Blackwell North America (B/NA)		Library Interface Systems		Science Press	
DATA BASE MAINTENANCE								
Titles in data base	125,000		125,000		125,000		125,000	
Titles can be converted to MARC II format (yes,no)	yes		yes		yes		Modified MARC	
Owner of data base is library (yes,no)	yes		yes		yes			
Annual transaction rate (acquisitions x 140%)	21,000		21,000		21,000		21,000	
Number of updates per year	4		4		4		4	
Transaction cost per update	10c each		$50 flat charge		10¢ add; 4¢ revise		Included in master-film costs	
Cost per update; no authority control (assume 40% are revisions)	$525		$50		$435			
Authority control cost per transaction	5¢		28¢		-		N/A	
Edit-list pricing included in transaction cost (yes, no)	?		no		no		?	
CATALOG PRODUCTION (one-time publication base on model assumptions)								
Number of titles	125,000		125,000		125,000		125,000	
Entries generated per title	3.7		5.5		4		3.52	
Total entries	462,500		677,500		500,000		440,000	
Entry bibliographic format (unit, abbreviated, combination)	comb.		comb. (medium)		unit		comb.	
Number of catalogs/lists included	1		4		4		3	
Entries per frame (average)	27		20		27		33.8	
Titles per frame (average)	7.29		3.6		6.75		9.6	
Microfilm information system (microfiche, roll film)	Fiche	Roll	Fiche	Roll	Fiche	Roll	Fiche	Roll
Reduction ratio	42X	42X	42X	48X	42X	42X	42X	48X
Frame width (in characters)	132	132	132	132	132	132	132	132
Frames allowed per microfiche or foot	208	40	200	40	207	33	207	40
Master-film frames produced	17,130	17,130	34,400	34,400	20,900	20,900	13,040	13,040
Master-film cost per frame	$.182	$.182	$.185	$.185	-	-	$.356	$.356
Copy-film cost (per microfiche or per foot)	$.30	$.06	$.12	$.05	$.30	$.06	$.187	$.187
Microfiche or roll film feet produced per catalog	83	428	172	860	101	632	63	326
Master-film production cost (exclude data base maintenance)	$3,125	$3,125	$6,375	$6,375	-	-	$4,653	$4,653
Copy-film production cost (per master-film copy)	$24.90	$25.68	$20.64	$42.98	$30.30	$37.92	$11.78	$16.95
Master-film cost per title	$.025	$.025	$.051	$.051	-	-	$.037	$.037

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X. MICROFILM SYSTEMS AND EQUIPMENT

Microfilm systems may be classed by two types of film, microfiche and roll film. When a library is considering COM catalogs, it must determine which type of microfilm system best fits its needs. Many of the considerations that must be appraised when determining these needs are presented in the following two subsections. The first subsection, Microfilm Systems, is a review of many of the considerations that must be examined when making a film appraisal. The second subsection, Microfilm Equipment, is a review of the considerations that must be examined when selecting the required support equipment.

Microfilm Systems. Based on the findings recorded in this report, only minor variations exist between the production procedures and the production costs of microfiche and roll film. Therefore, the production of the master film for either requires approximately the same amount of resources. The duplication cost of the copy film, however, does vary significantly. A copy of a catalog on microfiche can be readily obtained for less expense than a copy of the same catalog on roll film. See Copy-film production cost, page 44.

Expense, however, is only one factor to be considered when evaluating and comparing roll film and microfiche. Purpose and user sophistication are often the two most important factors used in making a determination. Even when a decision is made, it may not be an either/or situation. In a given instance, both roll film and microfiche may be necessary and justifiable. Some of the factors used in appraising the two systems follow.

Factors used in appraising roll film systems and microfiche systems:

- Purpose or use
- User sophistication
- Size of catalog
- Frequency of publication
- Supplements
- Current availability of reader
- Dedicated/non-dedicated reader
- Initial and continuing cost of reader
- Placement of catalog and reader
- Access frequency and speed
- Exposure to vandalism, loss, and destruction
- Browsing capability
- Instructions on use requirements
- Reproduction requirements (film to hard copy; film to film)
- Backup and security
- Production cost

In addition to these factors, some consideration should be given to the film used in the reader. One of three types of film is normally used: (1) silver halide; (2) diazo; and (3) vesicular. See Section VI, page 33, for additional information regarding the production and characteristics of each type.

The reduction ratio may also be a critical factor leading to satisfaction and acceptance by the user. Most commercial businesses utilize 42X. The U.S. Government and NMA recommend 48X. Within the library community there is some insistence to adopt 50X plus as a library standard. This insistence could lead toward the utilization of non-standard, specialized, expensive, single-source equipment. Regardless, selection of reduction ratio could be determined by the availability of microfilm readers and their use.

Some of the physical characteristics of both roll film and microfiche are:

Roll film
- 16 mm x 2.5 mil x 215 ft. (may vary in length to meet special needs, e.g., ROM 3 spool of 750 feet)
- spool or cartridge form
- 40 frames per foot at 48X
- 48x reduction is NMA recommended as U.S. Government standard

Microfiche
- 4 x 6 inch/105 x 148.75mm x 5 mil.
- Pages (frames) increase as reduction ratio increase, e.g., 20X = 60 frames, 42X = 208 frames, 48X = 270 frames.[18]

When evaluating microfilm systems, embedded expenses such as data base maintenance expenses, should not be overlooked. Even though these expenses are usually common to both roll film and microfiche, proper budgetary allowances must be provided. In an effort to determine the impact of some of the various expenses, the following table, Master Film Production Expenses, has been compiled. Maintenance and production expenses were extracted from the table, Commercial Operations Summary, page 44.

Master Film Production Expenses

	Auto-graphics	B/NA	Library Interface	Science Press
OCLC-MARC file 5,250 transactions	$ 109	$ 109	$ 109	$ 109
Management fee	-	375	-	-
Data base maintenance	525	50	25	-
Editorial expenses	(?)	(?)	(?)	(?)
Master film production	3,125	6,375	-	4,653
Master film total quarterly expenses	$3,759	$6,909	$ -	$4,762

As previously noted, no apparent cost difference exists between the production of roll film and microfiche master-film catalogs. Using the preceding master film total quarterly expenses as a basis, comparative quarterly projections for roll film and microfiche can be made using the following assumptions.

Microfilm system comparison assumptions:
- B/NA total quarterly expenses can be used as a basis for projecting microfilm production costs.
- Even though the number of microfiche readers required is often less than the number of roll film readers required for the same application, it is realistic to assume the number of readers will not vary significantly with a given system. Two readers will be placed in 34 remote locations and four will be placed at the central site.

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[18] Microfiche with a reduction ratio of 42X have a grid of 14 x 16 frames. The top row of frames is reserved for heading, yielding 208 (13 x 16) usable data frames. This standard is based on a 132 character-line frame.

- Maintenance requirements for roll film readers dramatically exceed the requirements of microfiche readers. This assumption is based on the fact a yearly maintenance contract (approximately $50 per unit) is readily available on most roll film readers. Microfiche readers are usually maintained on a per-call basis. Lamp ($20-$30 each) replacement every twelve to twenty-four months is the primary maintenance requirement for microfiche readers.
- The cost of microfilm equipment can be effectively amortized over a five-year period.
- Effective and practical roll film readers are available at network prices for $690, e.g., Information Design's ROM 3.
- Specific microfiche readers are available to many members at reduced rates through state contracts. Many styles and variations are available. One reasonable model is the Realist 3352II 1V COM with a list price of $239.
- Title average cost is a valid unit of comparison for the two microfilm systems.
- B/NA copy film production costs as stated in the table on page 44 are valid (microfiche copy = $20.64; roll film copy = $42.98).

Microfilm systems comparison of quarterly expenses:

	Microfiche	Roll Film
Master film total quarterly costs	$6,909	$6,909
Copy film costs (100 copies)	2,064	4,298
72 readers (5-year amortization)	860	2,484
Reader maintenance	90	900
Total quarterly costs	$9,923	$14,591
Quarterly average cost per title	7.9¢	11.7¢
(Yearly average cost per title	31.6¢	46.8¢)

In addition to this comparison, it is worthwhile to note the potential savings that may be achieved through the use of cumulative supplements. Using the B/NA estimates for five microfiche editions (see Exhibit D, Appendix) which are based on many of the preceding assumptions, the following comparison proves informative.

Catalog publication methods for one year:

	Five Reaccumulations During One Year	Yearly Reaccumulation with Four Cumulative Supplements
Annual master film cost	$35,288	$ 9,788
Annual copy film cost (assumes 100 copies per publication)	22,776	2,724
72 readers (5-year amortization)	3,440	3,440
Reader maintenance	360	360
Total yearly costs	$61,864	$16,312
Title average costs (average number of titles = 132,500)	46.7¢	12.4¢

Microfilm Equipment. Prior to choosing any hardware, a decision must be made as to which microfilm system is to be supported: roll film or microfiche. Once the decision has been made and a microfilm system has been selected, the evaluation and selection of each piece of support hardware must be in terms of its respective function and its physical characteristics.

Due to the quantity and variety of equipment available, evaluation and selection is greatly influenced by subjective factors. A summary of a few considerations used in the evaluation process is presented in the following paragraphs. For more detailed descriptions, which include evaluation techniques and examples, several sources are available.[19]

Three major classes of support hardware can be identified: readers, reader-printers, and duplicators. Even though each class has its own particular function, all classes share many common characteristics. Therefore, when evaluating a piece of equipment from any one of the three classes, common considerations can be identified. Before reviewing the unique considerations of each class, the common considerations are presented in the following list. In developing the list, it has been assumed that readers receive the initial hardware emphasis when establishing a microfilm system. Thus, the list gives readers the greatest attention.

Hardware common considerations:

- Durability
- Simplicity of design
- Ease of operation
- Low maintenance requirements
- Size and weight
- Power requirements
- Screen
- Lamps
- Mirrors
- Type and size of filmgate
  Scratch protection features
- Magnification ratio of lens (blowback)
- Heat dissipation
- Focus and manipulation controls
- Cabinet design
- Access methods
- Traffic
- User instruction requirements
- Warranties and service
- Cost; initial and continuing.

In addition to these common considerations, use is an important consideration that must not be overlooked. In reference to readers, use falls into two categories, occasional and general. An occasional user is required to scan to a point in the film and read for a few moments. A general user is required to read for an extended period of time once the point of entry has been determined. A 75% screen-image blowback (image magnification) is acceptable for the occasional reader. A 95-150% blowback is recommended for the general reader.

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[19] See the reports by Gaddy and Hawken.

As previously stated, each class of support hardware has its own function and special evaluation considerations. The following paragraphs are a brief review of each class and related considerations.

NMA defines a reader as "a projection device for viewing an enlarged microimage with the unaided eye."[20] Hence, if COM catalogs are used, readers are obviously mandatory equipment for catalog access. Two primary types of readers are available: roll film readers and microfiche readers. The two following lists note specific considerations relevant to the respective readers.

Roll film reader considerations:

- Ability to move the film forward and backward
- Various speeds at which the film can be moved
- Time to stop or brake the movement of the film
- Braking method used to prevent film damage
- Film storage: spool or cartridge
- Loading and unloading complexity
- Loading and unloading time requirements
- Exposed/unexposed spool or cartridge
- Film capacity in feet
- Availability of controls while seated

Microfiche reader considerations:

- Constant frame-to-frame focus
- Easy frame-to-frame scanning capability
- Easy-to-use frame location index (some microfiche catalogs are formatted to eliminate the index frame, making this a feature of limited value)
- Self-opening flats for changing individual fiche
- Fiche protected from direct contact of lens
- Roller bearings used in glides supporting the flats
- Dual or multiple lens (useful in non-dedicated readers, e.g., a reader used by an engineering department where, in addition to the catalog at 42X, schematics at 24X are reviewed)

NMA defines a reader-printer as "a machine which combines the functions of a reader and an enlarger-printer."[21] An enlarger-printer is defined by NMA as "a machine which projects an enlarged image for microfilm, develops, and fixes the image of a suitable materials."[22] Thus, for microfilm catalog support, the "average" library may be able to justify one or more strategically placed reader-printers. One source reports that on the average, one reader-printer exists for every 13 readers.[23]

Reader-printer considerations:

- Controls easy to use and accessible while seated
- Sharp, contrasting copy
- Fast printing cycle
- Low print curl and fade resistance
- Long paper shelf life

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20 Gildenberg, 181.
21 Ibid., 181.
22 Ibid., 151.
23 Avedon, 206.

- Easy paper loading
- Jam-proof operations
- Low copy cost
- Quantity of copies (of questionable importance with catalogs)
- Bulk of machine
- Paper transport mechanism
- Printing process
- Number and capacity of paper stackers; input and output
- Input is pre-cut or roll paper
- Normal maintenance procedures: clearing jams; loading paper; refreshing chemicals; cleaning elements; etc.
- Coin operation capabilities

In addition to the listed considerations, the printing process is worthy of considerable attention. For reader-printers, the printing process is similar to those of other copy machines: silver or dry silver, electrochemical, electrostatic, and diazo. The last type is rarely used due to the long exposure time needed. Of the remaining three, electrostatic or xerography is usually more popular because it is dry, fast, and relatively inexpensive. It does require more maintenance however. The second type, electrochemical or electrolytic uses a special, three layer paper and is a wet process. The processing is faster than silver, but the prints are low in density and contrast. The silver process, both wet and dry, is called the photographic method. It has a low processing time and produces a noxious odor.

Neither of the terms "duplicators" nor "duplicators/copiers" is defined in the NMA glossary. However, for this document the terms are considered interchangeable and are defined as devices designed to reproduce on copy film either a master or intermediate microfilm image. Therefore, in an effort to provide further services to library patrons and to increase the accessibility of the COM catalog, a library may consider the purchase of a roll film or microfiche duplicator. In addition, users of other miscellaneous collections may be able to utilize the duplicator.

Duplicator considerations:

- Film widths accepted
- Film lengths accommodated
- Number of fiche accepted per exposure
- Speed
- Process (silver, diazo, vesicular)
- Bulk and weight
- Accessories
- Special features
- Normal maintenance procedures
- Noxious odors
- Coin-operated capabilities

From the information presented in this and the preceding sections, it can be seen that the selection of the proper operation (local and commercial) and the appropriate micorfilm system (roll film or microfiche) should not be made in isolation. In conjunction with the considerations presented in this document, library needs and resources must also be identified and defined. Thus, a final selection decision for microfilm systems and equipment should be made after the relevant information has been evaluated in terms of the library's goals, needs, and available resources.

XI. ALTERNATIVE SOLINET COM CATALOG PROGRAMS

After reviewing the current microfilm production techniques, some combination of the following alternatives would provide and effective plan for the SOLINET COM Catalog Program.

SOLINET microfilm catalog production alternatives:

1. Encourage and provide the documentation and training for the adoption of an existing successful system, e.g., Georgia Tech's, at other institutions which have both the interest and available resources for local operations.
2. Recognizing the competitive prices offered by service bureaus and acting as an agent for all members, negotiate the most favorable price for catalog data base maintenance and microfilm catalog production.
3. Divide the procedures of catalog maintenance and microfilm catalog production into their respective stages; negotiate the most favorable price for each stage with the intentions that SOLINET will monitor and coordinate all or specified stages.
4. Adopt a successful system, e.g., Georgia Tech's; rent time on a local time-sharing computer system; modify the adopted system to fit the constraints of the time-sharing system; and implement the basic procedures developed by the designers of the adopted system.
5. Design, develop and implement a new system which will create and maintain a union catalog data base; provide a range of institution and union microfilm products; and utilize the computer resources offered through a time-sharing computer system or resources acquired and placed in-house.

All alternatives must be viewed in terms of SOLINET's current size and in terms of one data base containing all recorded titles. As of August, 1976, SOLINET had 150 members. These members have input into the OCLC data base approximately 2.7 million holding symbols. Based on the results of the Florida COMCAT project, the 2.7 million locations can be translated into approximately 1.4 million titles. Thus, to meet the needs of each member with its respective holdings, time and resource requirements must be properly allowed and allocated.

Time requirements for a centralized system without the proper design could become astronomical. For example, if SOLINET were to adopt a local-operations system and implement it as is, the possibility exists that only a limited number of members could be served. To illustrate, if it is assumed that only 100 members are served and each averages 30,000 titles in machine-readable form, the following time requirements may be projected for the quarterly production of microfilm catalogs.

- 2500 titles processed per hour (see elapsed-time requirements, page 42)
- 3,000,000 titles massaged (100 x 30,000)
- 1200 elapsed hours (3,000,000 ÷ 2500)
- 60 elapsed days (1200 ÷ 20 hours)
- 76 days per quarter (365-62-10) ÷ 4)
- 79% of each quarter consumed with microfilm production only (60 ÷ 76); no time for data base maintenance and other necessary activities is inclued in the 79%.

Each of the SOLINET microfilm production alternatives can be successfully argued in terms of cost. Cost, however, cannot be the only factor used in the evaluation. All of the alternatives vary in terms of standards, flexibilities, and controls.

No effective standards which specify widely accepted display formats, type of entries and content, reduction ratios, and other related characteristics for microfilm catalogs have been established. AMIGOS, the Southwest network, is attempting to compile and issue a set of standards and specifications to which all operations serving the AMIGOS participants must adhere. To meet the needs of the network, a comparable set of standards must be adopted by SOLINET.

If all or most of the generalized procedures presented in Section IV, COM Production Overview, are processed by commercial firms, SOLINET and its respective libraries will have limited flexibility regarding special features and enhancements. Vendors who are currently marketing microfilm cataloging services, are not anxious to modify their formats and procedures without additional financial considerations or long-term commitments.

Adequate SOLINET and library controls are a requisite for a satisfactory microfilm production operation. Controls must be provided which guarantee completeness and integrity of the data base, coordinate maintenance and production schedules, insure the quality and totality of the microfilm catalogs, promptly deliver a completed catalog to the respective library, and impose all standards with promptness and clarity. With local operations, these controls are embedded and are relatively easy to administer. When a commercial operation assumes all or part of the responsibility, it also assumes dominant control over its portion of responsibility. Relinquishing dominant control often proves to be as taxing as the complete absence of control.

Selection of the appropriate alternative cannot be made in isolation. Participants in the selection process must be aware of additional SOLINET technical developments schedules for the near future.

SOLINET near-term developments:

1. The acquisition of all SOLINET OCLC-MARC records plus the continuing subscription for the most current records;
2. The installation of communications equipment which will interface with member institutions and OCLC;
3. The installation of an information retrieval service, and
4. The development of procedures which will aid in the construction of a union data base.

Thus, the alternative selected must be effective, practical and complementary to the other scheduled developments.

XII. CONCLUSION

Based on the information gathered for this report, COM catalogs for one library, when maintained in lieu of card catalogs, will not always provide direct cost savings for the library. COM catalogs will, however, allow the distribution of the catalog to locations which would otherwise be impractical to serve.

Resources required to support a local operation are often available. When they are available, coordination of key elements may prove to be nearly impossible. Library catalog priorities are usually considered only after all other local processing activities have been completed. Needless to say, all other processing activities are rarely completed to the extent that a large portion of the computer resources can be dedicated to the library for a sizable period of time. Due to these local constraints, and as an alternative to commercial operations, a cost-effective centralized system managed by SOLINET should prove effective.

Union COM products are practical tools for displaying titles jointly held by multiple libraires and for displaying related copy/volume information. Interest in these tools is being generated because libraires cannot expect to have continued free access to the OCLC on-line system for non-cataloging activities. OCLC is fast approaching the point where the implementation of a search charge for non-cataloging activities will be a necessity. With the implementation of such a charge, union COM products will become more attractive. The responsibility for the production of the resulting union products will rest with SOLINET.

The acceptance by SOLINET of the responsibilities and duties for the production of both local and union COM products provides an opportunity for the expansion of the total SOLINET cooperative program. Several alternative courses of action for the COM program have been presented. After considering each alternative, the Committee on COM will draft and recommend the conceptual plan for SOLINET's COM Catalog Program and its course of development.

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APPENDIX

EXHIBITS

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EXHIBIT A 10/12/76

COM CATALOG
by
Edward G. Roberts
Director of Libraries
Georgia Institute of Technology
Atlanta, Georgia

CONVENIENCE

The COM catalog is a portable facility. At Georgia Tech there are approximately 45 catalogs outside the Library in every academic and research department, and 16 catalogs in the building. Ten of the sixteen are public access. One is placed on each floor. Six are in library work areas.

The COM catalog brings convenient access to the user. It can afford remote dispersed access. The user can sit down to use it. He can move efficiently from one segment of the catalog to another without leaving his chair. Searching is significantly faster than in a card catalog. He can reproduce portions of it on a reader printer.

Filing in the film record at Georgia Tech is monthly. Theoretically it is possible to do it daily and produce a new fiche.

Multiple copies made remote access, ordering from a central store, and delivery to the user where he is, possible. This is the heart of the Georgia Tech Library system. For a cost of about $12,000 per year the Georgia Tech Library operates a dispersed catalog system delivering over 25,000 documents a year to the faculty. This is our real justification for the COM catalog. It is an instrument by which we can extend service.

Microfiche readers are relatively inexpensive $150-200 per unit. We estimate 20 readers will give far greater access in the Library than the card catalog. And being placed all over the building they allow the user to search the catalog in the context of the books, journals around him. The user does not have to make the long walk back to the card catalog every time he wants to check a title or call number. A user can even take a COM catalog and reader home with him.

SAVINGS (Georgia Tech Library estimates) for LENDS

(1) In faculty time productivity - over $300,00 to the institution annually.

(2) In library staff time saved from convenience access - approximately $19,000 (-$12,000 operational costs) = $7,000 actual savings.

(3) In student time - no way to estimate but it is likely to be substantial.

(4) Potential savings in machine filing and elimination of cards are estimated at approximately $15,000 per year.

SECURITY

Destruction of 100 copies of the catalog is well nigh impossible. The card catalog is quite vulnerable to vandalism, etc. Reconstruction of lost catalog records would be extremely expensive. With a COM catalog the catalog record is completely protected.

CARD CATALOG

A card catalog is a stationary facility which can accomodate multiple users. (Georgia Tech Library's catalog can accomodate 16 persons efficiently. Beyond 16 it is too crowded.)

The user must come to the catalog and must stand to use it. The drawer needed may be in use by another.

The cost of each 72 drawer unit is approximately $2,000. Georgia Tech Library buys a new cabinet every other year (or an annual expenditure of $1,000).

Filing is on a 2/3 day basis (depending on receipt from OCLC). Currently this is one of the chief arguments - up-to-dateness - for the card catalog.

Filing costs (staff time)

Filing costs	$10,000
Card costs	5,000
	$15,000

EXHIBIT B

COM Systems Service Center Directory

Southeastern States

- Computer Microfilm International Corporation
  1758 Tully Circle, N. E.
  Atlanta, Georgia
  (404) 321-5170

- General Computing Corporation
  21 West Church Street
  Jacksonville, Florida 32202

- General Micrographic
  60 Eleventh Street, N. E.
  Atlanta, Georgia
  (404) 872-1826

- KAL/COM-Division of Kalvar Corporation
  909 South Broad
  New Orleans, Louisiana 70125

- Wachovia Services, Inc.
  P.O. Box 3176
  1100 South Stratford Road
  Stratford Executive Park
  Winston-Salem, North Carolina 27102

- For a United States directory of system service centers, see Don M. Avedon, Computer Output Microfilm, p. 64-67.

EXHIBIT C

Vendor/Service Bureau Directory

- Auto-graphics, Inc.
  1820 Golf View Court
  Reston, Virginia 22090
  (703) 591-8689
  Rep.: Mr. Peter K. Adler
  Manager, Library Services

- Blackwell North America, Inc.
  10300 S. W. Allen Boulevard
  Beaverton, Oregon 97005
  (503) 643-8423
  Rep.: Mr. Bruce Alper
  Vice-President

- Inovar-Division of Bro-dart, Inc.
  1609 Memorial Avenue
  Williamsport, Pennsylvania 17701
  (717) 326-2461
  Rep.: Mr. George Steinbach
  Library Automation Division

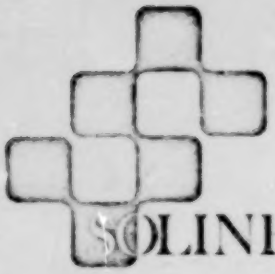
- Library Interface Systems, Inc.
  17118 Stodola Road
  Minnetonka, Minnesota 55343
  (612) 938-9569
  Rep.: Mr. Tom Worthly

- Science Press
  300 West Chestnut Street
  Ephrata, Pennsylvania 17522
  (717) 733-7981
  Rep.: Mr. Alfred W. Baker

EXHIBIT D

Auto-graphics

SOLINET Microfilm Review



Auto-graphics, Inc.
1820 Golf View Court
Reston, Virginia 22090

8697
(703) 591-~~2689~~

Mr. Peter K. Adler

Retrospective Conversion	
Transaction format (transactions library supplied)	OCLC/MARC
Data base preserves MARC format (yes-no)	Yes
Owner of data base is library (yes-no)	Yes
Titles in data base	125,000
Cost per title	$.05
Total cost	$6250
Date Base Maintenance	
Transactions - annual average	15,000
Updates per year	4
Cost per transaction	$.10
Total annual maintenance cost	$1500

Catalog Production:	Roll Film	Microfiche
Number of titles	125,000	125,000
Entries generated per title	3.7	3.7
Total entries	462,500	462,500
Entry bibliographic format (full, abbreviated, combination)	Comb.	Comb.
Number of catalogs/lists included	1	1
Reduction ratio	42X	42X
Entries per frame (average)	27	27
Frames per foot/fiche	40	208
Feet/fiche per master	428	83
Number of duplicates	Customer specified	
Costs:		
Print-image magnetic tape	* $3125	$3125
Authority control	$.05	$.05
COM setup		
Master roll/set		
Duplicate roll/set unit cost	$25.68	$24.90
Duplicate balance (unit cost x n-1)		
Total cost		

Others available

* Includes items 1,3 & 4

Average Costs:		
Master foot/fiche		
Master frame		
Master title	$.025	$.025
Master entry	$.00675	$.00675
Duplicate foot/fiche	$.06	$.30
Duplicate title		

1820 GOLF VIEW COURT • RESTON, VIRGINIA 22090 • TELEPHONE AREA CODE (703) 591-8889

NOV 02 1976

October 28, 1976

Mr. G. Randall Cravey
Technical Coordinator
SOLINET
Suite 820, 615 Peachtree Street, N.E.
Atlanta, Georgia 30308

Dear Mr. Cravey:

Thank you for your interest in Auto-Graphics' library services. As you may be aware, we have been providing the library community with computer generated catalogs and catalog support services for over a decade. Many of the products were, and still are, printed book catalogs. However, that is rapidly changing and virtually all the demand now is for microform outputs.

We produced our first film output for the Marin County, Calif. Library approximately two years ago. A little more than one year ago, we converted the Baltimore County Public Library from print to film. At the current time, we are producing film for about a dozen library institutions, and we anticipate either adding or converting at least another dozen in the next six months. Some of the current catalogs are being produced from OCLC tapes.

We believe that part of our success in the market place is due not only to the versatility of our processing system and the economies of film, but also the presence of a high quality reader of our own design. This has provided the library client with the complete assurance that film, indexes and readers will be 100% compatible. Consequently removing the difficult question of which supplier is responsible for the different elements of performance.

We have attempted to complete the cost survey form to the best of our ability. There are some areas which are subjective and therefore, difficult to answer in this context. Graphic format and frame density is one such area. Within certain broad parameters, these items may be whatever the using library wishes them to be.

I am enclosing some sample microfiche for your review. I will be forwarding another sample of roll film which will provide another example of a customer designated format and frame density. The roll film may be produced on either a sprocketed or non-sprocketed material.

You will note that under catalog production costs, we have combined the costs associated with a print-image tape, COM setup and master COM under one price of $.025 per title processed.

Please call me at (703)591-8689 if you have any questions. Thank you for your consideration.

Cordially,

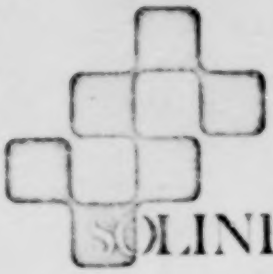
Peter K. Adler

Peter K. Adler
Manager, Library Services

EXHIBIT E

Blackwell North America

SOLINET Microfilm Review



Blackwell North America, Inc.
10300 S. W. Allen Boulevard
Beaverton, Oregon 97005

(503) 643-8423

Mr. Bruce Alper

Retrospective Conversion		
Transaction format (transactions library supplied)		OCLC/MARC
Data Base preserves MARC format (yes-no)		Yes
Owner of data base is library (yes-no)		Yes
Titles in data base		125,000
Cost per title	Note 1.	$.0004
Total cost	Note 1.	$50 flat charge
Date Base Maintenance		
Transactions - annual average		15,000
Updates per year		4
Cost per transaction	Note 1.	$50.00 tape run
Total annual maintenance cost	Note 1.	$200.00 year

Catalog Production:		Roll Film	Microfiche
Number of titles		125,000	125,000
Entries generated per title	Note 2.	5.5 average	5.5
Total entries	Note 3.	3,643,750	893,750
Entry bibliographic format (full, abbreviated, combination)	"Medium"	(Note 2, Appendix B)	
Number of catalogs/lists included	Note 2.	4	4
Reduction ratio		48X	42X
Entries per frame (average)	Note 2.	20	20
Frames per foot/fiche		40	208
Feet/fiche per master 5 editions -	Note 2.	4,554 ft/year	224/year
Number of duplicates		Unlimited	Unlimited
Costs:			
Print-image magnetic tape	Note 4.	Included in Master roll/set	
Authority control	Note 5.	$29,200.00	$29,200.00
COM setup	Note 6.	$1,500/year	$1,500/year
Master roll/set	Notes 3, 4 & 7.	$33,787.50/year	$8,287.50/year
Duplicate roll/set unit cost	Notes 7, 8.	$227.75/year	$27.24/year
Duplicate balance (unit cost x n-1)			
Total cost Without Auth. Contl.	Note 1.	$35,515.25/year	$9,814.74/year
With Auth. Contl.		$64,715.25/year	$39,014.74/year

Average Costs: (Without Authority Control)			
Master foot/fiche		$7.41	$43.69
Master frame		.1852	.2190
Master title	Note 9.	.2520	.0699
Master entry	Note 9.	.0458	.0127
Duplicate foot/fiche		.05	.12
Duplicate title		.0016	.0002

NOV 01 1976

BLACKWELL NORTH AMERICA, INC.
10300 S.W. Allen Blvd., Beaverton, Oregon 97005 Telephone 503-643-8423 Telex 360-458

October 28, 1976

Mr. Randall Cravey
Technical Coordinator
SOLINET
Suite 820
615 Peachtree Street, N. E.
Atlanta, Georgia 30308

Dear Mr. Cravey:

Blackwell North America is pleased to provide a response to your request for information on the production of microform catalog products.

We have fully completed the information sheet you supplied. In addition, we have provided support documentation and sample materials. Our response is reasonably comprehensive and it is desirable that the various notes indicated on the response form you supplied be examined as the document is reviewed.

BNA's microform catalog production service is widely used for a variety of libraries around the world. The flexibility of the system, in general, allows for a using library to define the content and formatted entries as presented by the system on a flexible basis. Because the system is driven by a full MARC II record, data is not lost in the process of formatting an entry which contains less data than is recorded in the MARC II record itself. Later editions of the catalog can expand or reduce entry content while accommodating a change in format. The authority control procedures offered by BNA are based on a truly automated subject authority control system which is driven by the list of subject headings provided through the LC 8th edition data record service. This system automatically applies current heading practice to the library's data base as changes are received from the Library of Congress. The charges for subject authority control are levied on a one time basis per title. Thereafter, all changes supplied by the Library of Congress are applied at no cost as they are received. The SAC system also inserts cross-reference structures in the microform catalogs that are produced. The cross-references that are produced are consistent with the contents of the catalog and the system guarantees no blind cross-references in the final product it produces. Other authority control concepts which may be offered to you are generally based on frequency lists, and it remains

to the library user to determine which headings should be changed to reflect current Library of Congress authority. Moreover, the cross-reference structures inserted by these systems are generalized and do not reflect the actual title holdings in the catalog produced.

In general, we believe you will find that the BNA system reflects current state of the art technology and, in many cases, offers techniques and services not available from other sources. We look forward to the opportunity to working with SOLINET to implement the production of microform catalogs for its participating libraries. The price quotation provided in this Request for Information should be considered a model, and the actual cost charged may be lower or higher, in fact, depending on your requirements at the time of final negotiation. You should consider this quotation conservative, both in the flexibility it offers to you through the services suggested and through the pricing techniques used.

Sincerely,

THE BLACKWELL GROUP OF COMPANIES

Bruce H. Alper

Bruce H. Alper
Group Computing Director

BHA/ph
Attachment (1)

INFORMATION SHEET TO SOLINET MEMBER LIBRARIES

Date: October 22, 1976

I INPUT PROCESSING

A. Structure Edit

1. One time fixed fee to modify B/NA input for "raw" OCLC-MARC will be borne by B/NA.

2. Input processing of "raw" OCLC-MARC archival tapes per run (minimum) ----------$50.00

B. Content Edit and Data Base Maintenance (per merged MARC record)

1. B/NA "form of entry" edit for all descriptive cataloging entries, per title/record and B/NA Subject Authority Control for choice and form of entry, per title record-- .28

a. For any data base to which at least 25,000-35,000 records per year are added - per title/record ---------- .25

b. For any data base to which at least 35,001-50,000 records per year are added - per title/record---------- .23

c. For any data base to which more than 50,000 records per year are added - per title/record ---------- .20

2. Further, B/NA can provide an optional service where the Library or B/NA can review the text of all entries. B/NA will supply alphabetized proof listings of all descriptive cataloging. This general process is called Field Update and uses a procedure called BASIC FIX.

a. B/NA reviews listings, B/NA codes and keys input according to BASIC FIX, B/NA proofs output per MARC field updated---------- .20

b. Library reviews listings, B/NA codes and keys input according to BASIC FIX, Library proofs output, per MARC field updated---------- .08

c. Library reviews listings, Library codes input and B/NA keys input according to BASIC FIX, per MARC field updated---------- .06

d. Library reviews listings, Library codes and keys input according to BASIC FIX, Library proofs output, per MARC field updated---------- $ .03

II MICROFORM OUTPUT

A. Sorted print tape (to be returned to B/NA), per title/record ---------- .046

or

B. 42X COM fiche by B/NA (includes sorting costs in A)

1. Master copy, per title record ---------- .051

2. Per added copy, per microfiche ---------- 0.12

or

C. 42-48X COM film by B/NA (includes sorting costs in A)

1. Master copy, per title (minimum)---------- .051

2. Per added copy, per foot/copy (minimum)---------- .05

D. Annual management fee, per catalog/year, quarterly service- $1,500.00

E. Copies of data base used for any edition of catalog either in sorted print line images or as unsorted MARC records---- $ 50.00 (plus cost of new tape)

NOTES

1. Structure Edit

   B/NA has assumed that the computer edit of each record to detect multiple locations and multiple usage of a record will be as follows:

   a) When two or more OCLC MARC records have the same OCLC serial number, the bibliographic data will be merged and multiple 090, 096, and 099 fields maintained as required. 050 and 060 fields will be maintained.

   b. When two or more OCLC MARC records have different OCLC serial numbers even though the bibliographic data is identical in all other respects, separate MARC records will be maintained at B/NA. The cost for this service is $50.00/computer run.

2. The average is 5.5 entries/title, excluding analytics. Generally, we provide a shelflist, author, title, and subject catalog. Occasionally we are asked for a series catalog as well. Dictionary catalog may be provided, for example, author/title/series, author/title/series/subject. A union catalog may also be split up to show sub-catalog such as branch libraries, special collections or special subject lists.

   The sample catalog attached as Appendix B is a divided 4 alphabet union catalog with medium entry density. It lists about 6,000 titles and 9,000 books in 6 branch libraries. The fiche is 42X, 105 mm x 148 mm, diazo process copies. The original was silver halide on a Quantor 105. The character set used for this catalog was not the full ALA character set.

3. We have calculated five total reaccumulations for film. For fiche we assumed an annual (initial) accumulation and four accumulative supplements thereafter.

   Quantities

Edition #	Film		Fiche	
	Titles	Entries	Titles	Entries
1	125,00	687,500	125,000	687,500
2	128,750	708,125	3,750	20,625
3	132,500	728,750	7,500	41,250
4	136,250	749,375	11,250	61,875
5	140,000	770,000	15,000	82,500
	662,500	3,643,750	162,500	893,750

224/fiche/year

Costs

Edition #	Film		Fiche	
	Master[B]	Per/copy[B]	Master	Per/copy[A]
1	$6,375.00	$42.97	$6,375.00	$20.64
2	6,566.25	44.26	191.25	.72
3	6,757.50	45.55	382.50	1.44
4	6,948.75	46.84	573.75	1.92
5	7,146.00	48.13	765.00	2.52
	$33,787.50		$8,287.50	
Annual fee	1,500.00	Per/copy/yr	1,500.00	Per/copy/yr
Per Year Costs	$35,287.50	$227.75	$9,787.50	$27.24

A Assume 4,000 entries/fiche

B Assume 20 entries/frame, 40 frames/foot, 5¢/ft/copy.

We have assumed a format similar to the page/entry layout of University of Texas, Permian Basin and Stelco.

4. If B/NA produces the print tape and the COM masters, the cost of the COM master includes the sorting and generation of print tape. Print tapes cost .046/title. COM fiche or film masters cost .051/title. Quarterly print tapes based on our assumption for SOLINET would cost, per year.

Print tapes for film $30,475 + $1,500 = $31,975.00

Print tapes for fiche $ 7,474 + $1,500 = $ 8,975.00

5. Authority control is a part of the content edit service which is optional. The purpose of the service is to ensure uniform choice and form of entry so that the filing of entries is consistent. Problems usually arise when union catalogs are produced or as a library amends practice in descriptive and subject cataloging over time.

B/NA can provide catalog editors and all necessary systems effort to:

1. Review form of entry in descriptive cataloging.

2. Review choice and form of entry in subject cataloging against LCSH/8 authority. This includes validation and interfiling of cross-references.

The list price per title for both services, including perpetual maintenance is not more than $0.28. Discounts are negotiated for large data bases and large amounts of work per year.

Descriptive information is attached as Appendix A. Samples of COM fiche for which the data was edited are enclosed as Appendix B.

If the library supplies editor effort for the above edits, further price reductions can be negotiated.

Based upon our price schedule, the content edit including authority control

retrospective	125,000 @ $0.20	$25,000.00
yearly	15,000 @ $0.28	$ 4,200.00

including perpetual maintenance thereafter.

6. The fees vary. They are assessed annually according to the frequency and complexity of the schedule. The range is $800 - $2,800/year. This fee is negotiable for large data bases. The list price for quarterly service is $1,500 per year.

7. With COM film we usually subcontract the actual COM to the manufacturer of the reader. We supply the print tape to their spec. Additional costs may ensue, depending on the vendor. For the purposes of this quote, we assumed no added costs. The price of 5.1¢/title includes all entries sorted and laid up for that title.

   Since most COM film vendors quote per frame or per foot and use a ratio of about 4 entries/title, we will compute and convert the actual cost to a per title basis once the film type, reduction ratio and page/entry layout is known.

8. Fiche cards are copies currently for 12¢ each. Film copies cost between 5¢ and 6¢ per foot per copy. We priced here at 5¢.

9. In the figures above, the average cost per master title and per master entry can be measured on 2 different bases. Above we assumed net annual titles input; below we assumed net annual titles output. The output quantity is greater.

	Roll Film	Microfiche
Average costs for 662,500 titles/year		Average costs for 162,500 titles/year
Master foot/fiche	$7.41	$43.69
Master frame	.1852	.2190
Master title	.0532	.0602
Master entry	.0097	.0109
Duplicate foot/fiche	.05	.12
Duplicate title	.0016	.0002

This results in an average lower cost per title. A comparison is on the following page.

ACTUAL COST/TITLE/YEAR

	140,000 Input Records	162,500 Output Records
Fiche Master	.0699	.0602
Fiche Copy	.0127	.0109

	140,000 Input Records	662,500 Output Records
Film Master	.2520	.0532
Film Copy	.0458	.0097

BLACKWELL NORTH AMERICA, INC.
10300 S.W. Allen Blvd., Beaverton, Oregon 97005 Telephone 503 643 8423 Telex 360 458

APPENDIX A

This document has three purposes:

1) To explain how Subject Authority Control (SAC) works;

2) To clearly explain the differences between B/NA SAC and the limited service offered by Bro-Dart/INOVAR;

3) To explain other optional editing services offered by B/NA.

The essence of our discussion is the relationship between choice and form of entry in Subject Cataloging, and the effort required to:

1) Assign new subject headings for current work according to ever changing LCSH/8;

2) Delete obsolete and objectionable terms from previous work and bring some up-to-date;

3) Implement and maintain local practice to supplement LCSH/8.

Not only must the correct entries be chosen, but they must be correctly transcribed in a consistent form so that spelling, syntax and punctuation do not impede filing.

In a computerized catalog of MARC records "correct" choice and form of entry are critical because a computer cannot remember all the various filing idiosyncrasies of a Library: "U.S." must be spelled out as "United States", "Control of vice" must be recataloged for all entries as "vice control" or, even with the help of a see reference, entries will be split.

This intrinsic and ongoing problem in one library's Catalog Department is compounded when a union catalog is considered. Not only must variant practices be resolved so that "like" entries are grouped, the union catalog must also refer the user familiar with other choices and forms of entry to the preferred entry, i.e. see and see also references are necessary.

These processes are necessary to keep abreast of growth and change in the universe of knowledge. Ultimately, our index tools change: LCSH/8 is subject to quarterly additions and changes. Most libraries also develop special "form/pattern subdivision" and "nonprint" headings for which LCSH/8 provides only guidelines. Some libraries maintain special headings beyond the scope of LCSH/8. All the preceding is subject to professional judgement at each library.

The purpose of B/NA Subject Authority Control Service is to maintain an ever changing MARC library database in concert with an ever changing (and locally supplemented) LCSH/8. B/NA provides all systems effort and all staff effort to maintain and operate the service.

The B/NA Subject Authority Control System contains an actual machine-readable authority file: Recently LCSH/7, now in process to LCSH/8. Our discussion will focus on the latest format, LCSH/8. Four basic types of activity are occurring when SAC is used:

1) LC may change a heading. For example, since the original accumulation of LCSH/8,

   Electronic data processing - - business

   has recently been changed to:

   Business - - data processing.

   When the revised entry is received at B/NA and posted to LCSH/8 in SAC, all library databases subsequently SAC'ed are then revised. SAC has chosen a new entry. This requires no human intervention for each database to be SAC'ed after the SAC editors have verified the entry into the SAC (LCSH/8) file.

2) A library may have previously cataloged an entry as:

   Social security - - U.S.

   According to LCSH/8, this is a valid subdivision except that the geographic place name should be expanded, yielding:

   Social security - - United States.

   At an earlier date, all U.S. entries in SAC were revised to United States. The SAC System has detected the varient form of entry and, on the basis of previous experience, it displays the "best" solution. An editor at B/NA must authorize the proposed change and allow SAC to update the appropriate OCLC MARC records.

3) A library may have cataloged an entry according to LCSH/7 as:

Insurance, social - - Ark.

According to LCSH/8, the choice and form of entry must be revised:

Social security - - Arkansas

SAC will propose a solution for review by our staff. SAC will execute these functions for any number of entries after an editor at B/NA authorizes the overall "new" entry. A new SAC record is created usually with cross reference from the old entry.

4) A Library may have a book cataloged by LCSH/7 as:

Child study

Under LCSH/8, this heading, two entries are now used:

Child development

Child psychology

All older entries must be revised and the obsolete term deleted from SAC in favor of the newer term(s). A see reference is necessary in SAC because most users will be familiar with "Child study". B/NA staff would also insert a see also reference between the two newer terms. In this way, old practices are revised and newer practices are linked into a logical set of entries and references. B/NA supplies all the human and systems work.

Finally, after the database has been SAC'ed, the SAC System then verifies all cross-references and, eliminates all those which are blind. Each time the database is SAC'ed, the cross references are revalidated.

All systems and editorial review work is executed at B/NA according to the rules of LCSH/8 as monitored by the SAC software with an ultimate check by B/NA's staff of editors.

At INOVAR/Bro-dart the editorial effort is shouldered by the Library whilst the firm provides systems support.

Bro-Dart provides an alphabetized list of subject headings (whether or not they are LCSH/8) and a frequency of occurrence for each choice and form of entry. The Library staff must provide all the recataloging effort to revise choices, to verify forms and to insert and validate cross-references by editing voluminous printouts. The firm then takes the "authorized entries", revised subject cataloging for each entry. . . or the Library can do its own keying.

Bro-Dart does not operate the software to maintain an actual machine readable authority file with defined standards. The firm cannot thus keep abreast of evolutions in practice at LC. The only authority for users of this service is the actual library cataloging database (with cross references). The crucial point is this: When a library, at this time, works with Bro-Dart, the only way that the library can keep up with continual revisions to choice and form of entry supplied by LC and, supplemented by local practice is to completely review the entire file each time a new catalog is produced. This consumes much staff time at the Library.

The systems effort required is nominal. The professional effort required by the Library is substantial. . . so is the keying effort if the Library does this work.

To sum up then, the maintenance and supplementation of LCSH/8 by B/NA-SAC software and staff provides all systems and all librarian effort needed to revise all older choices and forms of entry to current practice when current practice itself is continuously changing. B/NA SAC also allows the Library to post special headings to the SAC file which are authorized only for that Library.

A similar argument ensues for the editing of descriptive cataloging.

The services provided by Bro-Dart are basically the same as before for the Subject Entry Editing Service. That is, systems support only. The Library must do the actual editing.

At B/NA, the standard service includes complete systems support. However, B/NA also supplies the human effort to actually verify the forms of entry in all descriptive main and added entries. Two optional servides exist:

1) B/NA can provide a service similar to that of Bro-Dart;

2) B/NA will develop name authority files for personal names, corporate names, conferences, series, uniform titles, etc. as required by the Library. The service is analagous to SAC, including cross-references.

In the usual form of entry edit, B/NA's staff checks for consistency in spelling, punctuation and syntax for all descriptive cataloging. B/NA does not reassign the choice of entry (unless Option 2 above is selected). In the usual B/NA service, entries for both Mark Twain and Samuel Clemens can exist but, each "form of" entry will be uniform to allow like entries to group. (If Option 2) were selected, probably a see also reference would be provided.

B/NA charges a combined one time entry cost of 28¢ for perpetual maintenance of choice and form of entry in subject cataloging against an everchanging LCSH/8 and for perpetual maintenance of form of entry in descriptive cataloging. This includes all systems support and staff effort at B/NA to maintain the integrity of the authority files themselves and maintain the Library database.

As we noted before, B/NA can provide less support than the "package" defined above; that is. . .

B/NA can provide printouts for the Library staff to edit. Either B/NA or the Library can key in the revisions using the procedure referred to as BASIC FIX.

Production of a (union) catalog from MARC records is a substantial task. Depending upon the time, budget, and staff available to the Library, B/NA wishes to indicate its commitment to undertake all or some of the tasks so that the Library can continue to select, acquire, catalog and process its current accessions without the added disruption of this special effort.

BLACKWELL NORTH AMERICA, INC.

September 1976

SOLINET Microfilm Review

Library Interface Systems, Inc.
17118 Stodola Road
Minnetonka, Minn. 55343

(612) 938-9569

Mr. Tom Worthley

Retrospective Conversion

Transaction format (transactions library supplied)	OCLC/MARC
Data Base preserves MARC format (yes-no)	yes
Owner of data base is library (yes-no)	yes
Titles in data base	125,000
Cost per title 10¢/Title first time in charge	104 Title
Total cost (Full record - author, title, subject catalog)	$12,500

Date Base Maintenance

Transactions - annual average	15,000
Updates per year 4¢/Title in file per up date	4
Cost per transaction 10¢/Title first time in charge)	$ 1,500
Total annual maintenance cost	21,500

Catalog Production:	Roll Film	Microfiche
Number of titles	125,000	125,000
Entries generated per title average (no NLM)	4 entries	4 entries
Total entries	500,000	500,000
Entry bibliographic format (full, abbreviated combination)	full	full
Number of catalogs/lists included	A/T/S/CR	A/T/S/CR
Reduction ratio	42X or 48X	42X or 48X
Entries per frame (average)(42X=27)(48X=24)	27 or 24	5,500/fiche
Frames per foot/fiche (42X=33fr/ft)(48X=43fr/ft)	33 or 43	207/fiche
Feet/fiche per master	850-2.5 midfilm	N/A
Number of duplicates	35 reels	35 fiche sets
Costs:		
Print-image magnetic tape (1-4)	P.025/frame	$ 2.95/fiche
Authority control	6¢/ft.	30¢/fiche
COM setup		
Master roll/set		
Duplicate roll/set unit cost		
Duplicate balance (unit cost x n-1)		
Total cost (4 update per yr.((42X Used)	$7,108 1st yr. (total size of roll) (=632 after last ACC)	$5,233 1st yr (total Fiche set =101 after last ACC)
Average Costs:		
Master foot/fiche	.86/ft.	2.95/fiche
Master frame	.02/frame	.02/frame
Master title	10¢ FTI	10¢ FTI
Master entry	6¢ FTI	64 FTI
Duplicate foot/fiche	$.05/ft.	.25/fiche
Duplicate title (Holdings)	.03/holding added	

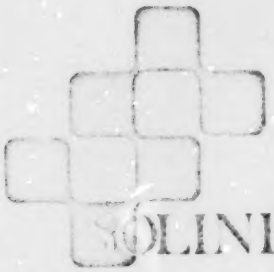
Southeastern Library Network Suite 820, 615 Peachtree St., N. E. Atlanta, Georgia 30308 Telephone (404) 875-0745
Affiliated with the Southern Regional Education Board

Editing: Listing in catalog sequence by either main entry or title $.025 per entry on hard copy or film.

EXHIBIT G

Science Press

SOLINET Microfilm Review



Science Press
300 West Chestnut Street
Ephrata, Pennsylvania 17522

(717) 733-7981

Mr. Alfred W. Baker

Retrospective Conversion	
Transaction format (transactions library supplied)	OCLC/MARC
Data Base preserves MARC format (yes-no)	Modified MARC
Owner of data base is library (yes-no)	Yes
Titles in data base	125,000
Cost per title	$.0115
Total cost	$1,437.50
Date Base Maintenance	
Transactions - annual average	15,000
Updates per year	4
Cost per transaction	N/A
Total annual maintenance cost	Included in Print-image Tape Price

Catalog Production:	Roll Film	Microfiche
Number of titles	125,000	125,000
Entries generated per title	3.52	3.52
Total entries	440,000	440,000
Entry bibliographic format (full, abbreviated, combination)	Combination 3 (Author, Title, Subject)	Combination 3
Number of catalogs/lists included	42 X	42 X
Reduction ratio	33.8	33.8
Entries per frame (average)	40/ft.	207/fiche
Frames per foot/fiche	326 ft.	63 fiche
Feet/fiche per master	?	?
Number of duplicates		
Costs:		
Print-image magnetic tape	$4,083.00	$4,083.00
Authority control	N/A	N/A
COM set up	N/A	N/A
Master roll/set	$570.00	$570.00
Duplicate roll/set unit cost	$16.90	$11.80
Duplicate balance (unit cost x n-1)	N/A	N/A
Total cost	N/A	N/A
Average Costs:		
Master foot/fiche	$18.68/ft.	$96.67/fiche
Master frame	$.468	$.468
Master title	$.049	$.049
Master entry	$N/A	N/A
Duplicate foot/fiche	$.052/ft.	$.187/fiche
Duplicate title	$.00014	$.00009

NOV 04 1976

science press Box 342 Herndon, Virginia 22070 Phone • 703/450-4477

November 2, 1976

Southeastern Library Network
Suite 820, 615 Peachtree St., N.E.
Atlanta, Georgia
30308

Gentlemen:

I am enclosing the information that you requested. Please let me know if I can be of further service.

Sincerely,
SCIENCE PRESS

Alfred W. Baker
Vice President

AWB/jc

Encl.

EXHIBIT H

COMCAT Retrospective Conversion Statistics

Library	Titles Converted	Unique Titles	% Unique
Florida A & M	10,381	3,039	29.2
Florida Atlantic Univ.	66,980	17,268	25.8
Florida International Univ.	35,247	9,880	28.0
Florida State University	49,825	23,543	47.3
Florida Technological Univ.	26,203	6,204	23.7
Jacksonville Public	170,670	47,380	27.8
Miami-Dade Community College	198,171	63,946	32.2
Orlanda Public	171,681	35,906	20.9
State Library of Florida	113,558	24,513	21.6
Tampa-Hillsborough County	134,330	23,302	17.3
University of Florida	51,771	27,420	52.9
University of Miami	77,168	43,512	56.4
University of North Florida	57,864	17,497	30.2
University of South Florida	60,864	23,236	38.2
University of West Florida	8,629	2,187	25.3
Totals	1,233,342	368,833	29.9

COMCAT Grant - $941,603
Cost per title converted - $.763

Statistics were extrapolated from Florida COMCAT; A Report of Florida's Catalog Project. Efforts to record special collections by several participants undoubtedly affected and inflated "% Unique".